INTERIM REPORT

OF

THE COMMISSIONERS

OF THE

TRANSCONTINENTAL RAILWAY

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OTTAWA
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THE COMMISSIONERS OF THE TRANSCONTINENTAL RAILWAY.

OFFICE OF THE CHAIRMAN,
OTTAWA, April 26, 1905.

Hon. HENRY R. EMMERSON, P.C.,
Minister of Railways and Canals,
Ottawa.

SIR,—I have the honour, under the direction of the Commissioners of the Transcontinental Railway, to transmit through you to His Excellency the Governor-General-in-Council, for the information of Parliament, the accompanying report, setting forth the receipts and expenditures of said Commissioners in connection with the eastern division of the National Transcontinental Railway, up to the end of March, 1905; also such other matters in relation to the said railway as appears to the Commissioners to be of public interest.

F. B. WADE,
Chairman of the Commissioners of the Transcontinental Railway.

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THE COMMISSIONERS OF THE TRANSCONTINENTAL RAILWAY.

OFFICE OF THE CHAIRMAN,

OTTAWA, March 31, 1905.

Hon. H. R. EMMERSON, P.C.,
Minister of Railways and Canals,
Ottawa.

SIR,—Under the direction of the Commissioners of the Transcontinental Railway, I have the honour to report, through you, to His Excellency the Governor General in Council, for the information of parliament, as follows:—

REASON FOR REPORT.

As you are aware, under the provisions of Chapter 71 of the Acts of 3 Edward VII., cited as 'The National Transcontinental Railway Act,' this Commission is required by Section 28 to furnish to the Minister of Railways and Canals monthly, or more frequently if desired by the Governor in Council, accounts of all receipts, expenditures and liabilities in connection with the work of the Transcontinental Railway. These reports have, from time to time, been furnished in accordance with the requirements of the Act.

By Section 30 of said Act, the Commissioners are required to make to the Governor in Council, through the Minister of Railways and Canals, an annual report for the information of parliament, setting forth the receipts and expenditures of the year and such other matters in relation to the Eastern Division of the National Transcontinental Railway as appears to be of public interest.

The said section reads as follows:—

'The Commissioners shall make to the Governor in Council, through the Minister of Railways and Canals, an annual report for the information of parliament, setting forth the receipts and expenditures of the year and such other matters as appear to them to be of public interest in relation to the said railway, or as the Governor in Council directs.

'Every such annual report shall be submitted to each House of parliament within fifteen days after the making thereof, or within fifteen days after the commencement of the next session of parliament, whichever first happens.'

Under this section, the time will not arrive for the making of an annual report until, at the earliest, the end of the present fiscal year, June 30 next.

But noticing by the proceedings of parliament that there was a desire on the part of certain members of the House that a report should be made of the doings of the Commission, I, on the 6th day of March last, wrote you in effect that if it was deemed desirable, the Commission was prepared at any time to make a report of its work.

On the 10th day of March, I received a letter from you, stating that it was desirable that a report should be prepared, affording as much information as is at the command of the Commission, so that it might be laid before parliament at once.

Immediately upon receipt of said letter, the Commission proceeded to gather the material necessary to make the report, now submitted, and in the preparation of same it has been the object of the Commission to furnish to parliament, through you and His Excellency the Governor in Council, all information which it is possessed of that will be of interest to parliament and the country.

ORGANIZATION OF COMMISSION.

The Commissioners and chief engineer were appointed by Order in Council, dated August 20, 1904, and the secretary by Order in Council, dated September 12, 1904, taking effect September 1.

The Commissioners and chief engineer met at Ottawa the latter part of August, and on August 29 held a preliminary meeting to discuss the question of organization and the plan of campaign.

The first meeting of the Commission, after the appointment of a secretary, was held on the 2nd day of September.

Having no offices, the Commissioners and employees were located in unoccupied rooms in the House of Commons, from the time of their first meeting until the 15th day of October, when we moved into our present quarters in the Corry building.

This building is conveniently situated, and affords fairly comfortable quarters for the Commission and the staff employed.

At first only two flats were rented, but soon, finding that these would be insufficient, the Commission decided it best to secure two other flats, so that as our staff expanded we would have space to accommodate them in one building. We, therefore, have the first, second, third and sixth flats, for which we pay the annual rental of $8,500.

The whole of the first, second and third floors are occupied by our officials, with the exception of one room, which we have sub-let temporarily to the Department of Public Works. We are only at present using two rooms on the sixth flat, but have sub-let a part of the space to the auditor general temporarily. In the very near future we will require all of the space for ourselves. Under the arrangement with the Department of Public Works and the auditor general, they must vacate upon demand. We charge them the same rent as we pay.

BOARD MEETINGS.

The board meets every week day when a quorum of two Commissioners is in town. The chief engineer attends all board meetings, takes part in the deliberations, and aids the Commissioners by his opinions and advice upon all matters. The secretary attends and keeps a careful record of all business transacted by the board.

PLAN OF WORK.

The first matter considered by the Commission was as to what work should be undertaken during the then approaching autumn and winter. It was decided that as the Grand Trunk Pacific Railway Company had had in hand the surveys from Winnipeg east to a point somewhere north of North bay, and as it might prove desirable to purchase and take over these surveys, it would be well for the Commission to first direct its attention to placing in the field parties along the line from Moncton to Lake Abitibi.

With regard to the route across the province of New Brunswick, as there was a great diversity of opinion as to whether a line across the centre of the province was obtainable at all, it was decided to run preliminary surveys from Moncton to Grand Falls by alternative routes, the one via Chipman, Fredericton and the valley of the St. John river to Grand Falls, and the other via or near Chipman direct across the country to Grand Falls.

As there was also a diversity of opinion as to whether the line further west should be located by the St. Maurice river and north of Lake Abitibi, or by the Mattawin river and south of Lake Abitibi, it was decided to explore both of these lines.

It was also decided to ascertain if a location could be secured from Lake Clear down the River du Postes to St. Michael and on to Joliette.

Acting upon this determination, that portion of the eastern division of the Transcontinental Railway from Moncton to west of Lake Abitibi was divided up into four districts, namely, 'A,' 'B,' 'C' and 'D.'

District 'A,' comprising that portion of the line between Moncton and the provincial boundary between the provinces of New Brunswick and Quebec.

District 'B,' extending from the said provincial boundary line to Clear lake, with the exception of a portion in the vicinity of the Quebec bridge, hereinafter referred to.

District 'C,' extending from Clear lake to or near the provincial boundary line between the provinces of Quebec and Ontario (east of Lake Abitibi).

District 'D,' from the western boundary of district 'C' to near longitude 84° west.

It was deemed desirable that, out of district 'B' a separate section should be formed, including that portion of the line on the south side of the St. Lawrence river between the southerly end of the proposed Quebec bridge and the junction of the line with the Intercolonial Railway, and from the northerly end of said bridge into the city of Quebec, and from the northerly end of said bridge westwardly to the boundary line between the counties of Quebec and Portneuf.

It was also decided that the work of these preliminary surveys should be proceeded with as rapidly as possible, and that arrangements should be made to carry on the same through the winter months.

It was soon after decided that the first district east of Winnipeg should also be organized and that the engineering work upon it should be carried on as rapidly as possible, so as not to retard the work of construction, thus leaving a portion of the line in the centre to be dealt with later, which has since been set apart as district 'E' the Winnipeg district being described as 'F.'

PROGRESS OF WORK.

On taking up its work, the Commission found itself confronted by many difficulties.

In the first place engineering staffs and men sufficient for some 34 parties had to be gathered together.

These parties had then to be equipped with instruments, tents, cooking outfits, provisions, blankets, &c.

Transportation facilities had to be provided running a large portion of the way through comparatively unknown country, and we had to organize an office staff, and arrange a system, calculated to properly conduct the business of the Commission.

The accounting had to be carried on so as to furnish,—

(*a.*) A monthly statement in detail to the Department of Railways and Canals of the receipts, expenditures and liabilities of the Commission;

(*b.*) The Department of Railways and Canals with properly certified and vouched invoices and pay rolls, showing all expenditures, with a duplicate of the same for the use of the auditor general;

(*c.*) To the Finance Department, a monthly statement of all cheques drawn against the funds furnished for the Commission.

In addition to this and to the ordinary books of account, it was found to be necessary to preserve a complete set of properly certified and vouched invoices, pay rolls, &c., to hold against the accounting which will have to take place with the Grand Trunk Pacific Railway Company, in order to ascertain the cost of the eastern division.

A *purchasing department* had to be organized to take in hand all purchases to be made by the Commissioners; and a *transport department* to take charge of the conveyance of supplies, men and mails to points along the line, where the same were needed.

These departments have been organized and are working smoothly.

Of course, it took some time to accomplish this, as it was not easy to secure the men, nor to at once assign the scope and nature of the services required.

We are glad to be able to report that the officers we have secured and the methods adopted are proving most satisfactory.

ENGINEERING WORK.

The engineering work has been carried on under the supervision of the chief engineer, Mr. Hugh D. Lumsden, whose services and advice we have had to avail ourselves of in many other matters than those strictly pertaining to engineering work, and which we have always found most valuable.

Appointments to the engineeering staff have been made by the Commissioners, in consultation with the chief engineer.

Some of our appointments were found, upon trial, to have been unwise. These errors have been corrected by the discharge of such unsatisfactory employees and the placing of good men in their stead.

The accompanying report of our chief engineer, incorporating as it does, the reports of the assistant chief engineer, and of district engineers Guy C. Dunn, A. E. Doucet and Major Hodgins, contains a concise history of the work carried on in the field from the start down to date.

I may say that reports arriving from the field since the date of Mr. Lumsden's report are most satisfactory.

I will take occasion later on to draw attention to some of the matters treated of in these reports.

NEGOTIATIONS AND PURCHASE OF THE SURVEYS, PLANS, ETC., MADE BY THE GRAND TRUNK PACIFIC RAILWAY COMPANY EAST OF WINNIPEG.

Early consideration was given by the Commission to the desirability of purchasing the surveys, plans, &c., made by the Grand Trunk Pacific Railway Company on the main line east of Winnipeg.

It was deemed desirable that these surveys, plans, &c., should be secured, as it would at once place the Commission in possession of a mass of valuable information, and enable them to proceed with the work much more rapidly.

Negotiations were, therefore, opened with the Grand Trunk Pacific Company, and on the 26th day of November, 1904, we made the company an offer which was contained in a memo. communicated to them, of which the following is a copy:—

COPY OF MEMORANDUM RE PURCHASE OF GRAND TRUNK PACIFIC SURVEYS.

1. We propose to purchase the surveys of the Grand Trunk Pacific east of Winnipeg, other than those which have reference to their proposed branch lines to Thunder Bay and North Bay; also their depots, cachés, tents, outfits, provisions, instruments, &.

2. We will pay for these their actual cost, allowing interest at the rate of 4 per cent from the time the bills are actually paid by the company.

3. The cost to be determined by accountants appointed by us, who will examine the books and vouchers under the supervision of our engineer. For this purpose the books and vouchers to be produced at the office of a chartered accountant in Montreal.

4. All maps, plans, field books and other data in connection with the said surveys to be handed over to us.

5. The cost of the said surveys to be computed to November 30, and all parties and materials in the field and elsewhere to be taken over by us on the first day of December.

6. The accounting to commence forthwith and to be pushed through as rapidly as possible.

7. If necessary, a portion of the payment to be deferred until after a further appropriation by parliament to the Commission, such deferred payment to bear interest at the rate of 4 per cent.

8. In order to facilitate the audit the company to forthwith furnish the following information:—

(*a*) Particulars of parties employed on said surveys.
(*b*) Duty and duration of their employment.
(*c*) Location of each party.
(*d*) Map showing ground covered by each party.
(*e*) An account showing the cost to the company of the whole survey.
(*f*) A statement of the depots, camp outfits and all supplies which the company has on hand and proposes to hand over, with the location of same.
(*g*) A statement of the personnel of officers and employees now employed in connection with the said surveys, the salaries being paid each, and their present location.

This proposition was not accepted by the company at once. They for a time insisted upon sundry conditions, which the Commission felt it could not accede to.

On January 13, 1905, the company finally accepted our offer. Immediately thereafter the Commission nominated Messrs. Kent & Turcot of Montreal, Mr. William Ainslie of Hamilton, and Mr. G. A. Bell, assistant chief accountant of the Railway Department, to audit the books and accounts showing the expenditures made by the company on said surveys.

The following is the letter of instructions given to the auditors:—

COPY OF LETTER OF INSTRUCTIONS TO AUDITORS.

THE COMMISSIONERS OF THE TRANSCONTINENTAL RAILWAY.
OFFICE OF THE CHAIRMAN.

OTTAWA, January 20, 1905.

Messrs. KENT & TURCOT,
WILLIAM AINSLEY, Esq.,
A. G. BELL, Esq.

GENTLEMEN,—I am directed by the Commissioners of the Transcontinental Railway to request that you will proceed without delay to Montreal, and there audit the books, vouchers and accounts of the expenditures made by the Grand Trunk Pacific Railway Company upon the surveys on the main line of the eastern section of the Transcontinental Railway.

I may say that the Commission has agreed to purchase from the said Railway Company all their surveys, plans, profiles, books, &c., other than those which have reference to their proposed branch lines to Thunder bay and North bay; also their depots, cachés, tents, outfits, provisions, instruments, &c., which they have on hand in connection with the said surveys, at the actual cost of the same, and allowing interest at the rate of 4 per cent from the time the bills were actually paid by the company, the said cost to be determined by accountants appointed by the board, who will examine the company's books, vouchers, &c., under the supervision of our engineer, and we have named you accountants for that purpose.

Mr. M. J. Butler, our assistant chief engineer, has been instructed to supervise the auditing of these accounts.

We would be glad if you would proceed to work at once, and continue same until it is finished, with as much despatch as possible. The company will furnish you with their books, vouchers and accounts, and will give you any information which you may desire. It had been arranged between the company and the board that this accounting should take place in the Montreal accountant's office, but it has since been agreed to by the board that same shall be done in the Grand Trunk Railway building, McGill street, provided a suitable room is furnished for your exclusive use.

Should any circumstance arise concerning which you have any doubt, I would be glad if you would bring same to my notice, and I will see that you have the views of the board upon the subject at once.

There are three things which I would like to impress upon the auditors, (1) that we are only to pay for the cost of surveys along the main line, and that you should be careful to see that nothing which was expended outside of that is considered; (2) we have agreed to pay the company what the surveys bona fide cost them; (3) we would like you to report whether the inventory of stock on hand, other than perishable, contains all that is charged for in the accounts produced before you.

I should have stated in the earlier part of this letter that the cost of these surveys is to be computed up to the 30th day of November, 1904, hence your audit will only come up to that time, and you will compute the interest on payments up to that time. Anything from that date to the present will be a matter for adjustment between the company and the board.

You will have to be advised by Mr. Butler as to where what is known as the North Bay Branch leaves, what we consider, the main line.

F. B. WADE,
Chairman.

While it had been agreed that the audit should take place in the office of the accountants at Montreal, it was found that it would be more convenient that the same should be carried on in the Grand Trunk building in that city, where the auditors were furnished with a separate room and every facility for making a careful and thorough audit.

The report of the said auditors is appended hereto and speaks for itself.

The audit was conducted under the supervision of our assistant chief engineer, Mr. M. J. Butler.

It will be noticed by the instructions given the auditors that they were enjoined to exercise the utmost care that no expenditures but those made upon the main line were to be considered.

Mr. Butler reported to us during the progress of the audit that he considered that four-fifths of section 3 of said surveys was not within the zone of the explorations which would have been made by the Commission upon the main line, and it was agreed as a result that the Commission would take over the cachés, equipment and outfits in connection with said section 3 and pay for one-fifth of the surveys made upon it, which would cover, in the judgment of our engineers, the portion which was reasonably within the zone of our explorations. We further agreed that if our chief engineer, after additional explorations, was of the opinion that any greater portion of said section 3 was within the zone which would have been explored by the Commission, the difference would be added to the amount that we would pay.

As will be seen by the report of the auditors, the amount arrived at as the cost of these surveys, including the supplies on hand, and one-fifth of section 3 above referred to, is $289,863.67, including interest up to November 30, 1904.

The total cost to the company of said surveys upon the main line east of Winnipeg, including the whole of section 3, amounted to $318,308.24, including interest from the date of payment to November 30, 1904.

It will be noticed that the auditors have made an itemized statement, showing how these figures are arrived at; also a statement showing the interest accumulations. This information is found in schedule 'A' of their report. Appended to said report are also Statements 'C,' 'CC,' 'D,' 'F,' 'G,' 'H,' 'K,' 'L,' 'M,' showing respectively:—

'C.'—Recapitulation showing the engineering equipment, camp equipment, stationery, kitchen equipment and supplies on hand November 30, 1904, with the various parties, stored at cachés, warehouses or storehouses, and at division or district engineer's offices. Cost of transporting same from railroad, freight charges, and also value of all cachés and other buildings.

'CC.'—Statement showing in detail supplies on hand December 1, 1904, and cost of same, at cachés Nos, 8a, 9, 9a, 10, 10a, 11 foot of Long Lake, 11a, 12, 13 Ombabika warehouse, Montizambert warehouse 14, 15, 16, 18, 19, 20, 21, and with field parties 4,

5, 6 and 7. Also cost of transporting supplies to above cachés and warehouses, and value of cachés and warehouses.

'D.'—Statement showing principal articles of engineering equipment and camp equipment purchased by the Grand Trunk Pacific Railway Company in connection with their surveys on the main line east of Winnipeg; also quantity on hand November 30, 1904 (as per their inventory).

'E.'—Statement showing equipment on hand in division engineer's office at North Bay and district engineer's office at Nipigon, and value of same.

'F.'—Statement showing dog feed on hand at various points outside cachés.

'G.'—Statement showing engineering equipment, stationery, kitchen equipment and firearms on hand with field parties on sections 8 and 9, and value of same.

'H.'—Statement showing supplies and equipment on hand at White Dog and Eagle river cachés and value of same; also value of buildings.

'K.'—Statement showing basis upon which assistant engineer and division engineers' salaries were pro-rated.

'L.'—Statement showing district and assistant engineers employed on the main line east of Winnipeg.

'M.'—Statement showing total cost of party No. 3 to November 30, 1904; also amount chargeable to Transcontinental Commission should the Commissioners take over only one-fifth (western end), including all supplies, engineering equipment, cachés and warehouses on that section.

The reason the Commission agreed to take over the cachés and supplies on the remaining four-fifths of section 3, was because it was desirable to have the said supplies in that part of the country, where they can be easily dropped down the streams, north. to the line projected by the Commission.

The auditors were engaged upon their work for some time, and the Commissioners are satisfied that a fair and impartial statement has been made. The company has handed over to the Commission all the property designated in the statement, so far as we know. The bulk of the plans were handed over previously to the completion of the audit and the balance recently. We have yet to receive sundry original reports, notes and field books.

Our respective district engineers have been instructed to take a careful inventory of all supplies, &c., in the different cachés and warehouses as taken over, and to report upon the same, in order that a comparison may be made, as far as possible, with the inventory furnished by the company and passed by the auditors.

Cachés 8a, 9, 10, 10a, 11, 11a, 11b, 12, 13, 14 and 15 and the warehouses at Ombabika and Wabinosh, have been examined and the supplies therein catalogued. They were found to contain 115,638 pounds of food supplies, the bulk of which was in good condition.

Most of the remaining cachés in the west have been examined, but we are not in receipt of the reports.

The remaining cachés in the east, viz., 6a, 7, 7a and 8 will be examined in the near future. After all these reports are received we will have the same checked and compared with the statements of supplies, outfits, &c., annexed to the auditor's report, in order to make it certain that we have received all we bargained for. So far, all representations made by the Grand Trunk Pacific Railway Company appear to be correct.

The Commission has also agreed to pay for the cost of the parties working in the field upon that portion of the main line taken over by us from and after the 1st of December, 1904, up to the date at which they were taken over by us. The cost of these parties has not been accurately ascertained as yet. We expect to have the exact figures in the course of a few days.

The report of Major Hodgins, district engineer for district 'F,' gives detailed information with regard to the parties taken over.

I may state in passing that at the time the arrangement was concluded it was stipulated by the company that they should be allowed to retain the services of their

chiefs of parties, we undertaking to fill their places within sixty days, but since then it has been agreed that we may retain any of these men we choose, who are willing to stay. In taking over the parties, we were not obliged to keep any of the men employed on these surveys unless we wished, but as most of them are desirable men, the Commission decided to retain the services of as many as would remain.

The value to the Commission of the plans and surveys made by the Grand Trunk Pacific Company which have been purchased by us is very great, and will much facilitate the location of the line through that end of the division.

Of course the agreement to purchase said surveys was made conditionally upon same being approved by the government, and parliament voting the money necessary to pay for them. The government has approved of the bargain.

APPOINTMENT OF DISTRICT ENGINEERS FOR DISTRICTS 'F,' 'E' AND 'D.'

Previously to the purchase of these surveys, Major A. E. Hodgins had been appointed district engineer, and put in charge of district 'F,' which extends from Winnipeg east to longitude 89° and 30 minutes. Subsequently Mr. C. E. Perry was appointed district engineer, and put in charge of district 'E,' which extends from the western boundary of district 'D' to the eastern boundary of district 'F.' Mr. S. A. Poulin, C.E., formerly assistant district engineer for district 'B,' has been appointed district engineer for district 'D.'

Major Hodgins' headquarters were first at Winnipeg, but have been removed to Rat Portage. Mr. Perry is situated at Nipigon, and Mr. Poulin's headquarters will be at North Bay.

Districts 'F' and 'E,' and a portion of 'D,' include the same territory as that traversed by the surveys of the Grand Trunk Pacific Company, only that we do not propose deflecting our line so far south, in the direction of North Bay, keeping it as far as possible in a direct line to Lake Abitibi.

FURTHER EXPLORATION OF TERRITORY COVERED BY GRAND TRUNK PACIFIC SURVEYS.

Although the engineers of the Grand Trunk Pacific Company were very strongly of the opinion that they had secured the best possible line through the country east of Winnipeg, the Commissioners, acting in harmony with the advice of the chief engineer, decided that it would not be advisable to take this for granted, but that further explorations should be made.

This work is being vigorously carried on in district 'F.'

In district 'E' we have now two parties, of those taken over from the Grand Trunk Pacific Company, and we propose augmenting these by putting in two other parties as soon as the state of the lakes and streams will permit.

In district 'D,' in addition to the parties now there, we purpose putting in three more as soon as conditions will permit. We will send these parties in from Woman River or Ridout stations on the Canadian Pacific Railway, following down the Ground Hog river to their points of starting work. These latter parties will, with the others in the field, cover the whole of district 'D.'

With these parties in the field, the whole work will be closely in hand from Moncton to Winnipeg, with every arrangement made for an active continuance of the surveys to completion.

We have reason to hope for a very substantial improvement upon the line obtained by the Grand Trunk Pacific, but it is too early yet to attempt to go into details.

PLANS.

We are submitting with the reports of the engineers, the plans referred to by them, namely,—

Plan of line from boundary between provinces of New Brunswick and Quebec to city of Quebec.

Plan of lines from Quebec to western limits of district 'B' (Waymontache).

Profile of line, district 'B.'

Plan showing exploratory surveys between Winnipeg and Lake Nipigon.

In addition to these, we are sending a plan showing the explorations between Moncton and Quebec.

We are also submitting a framed plan, showing the approximate location of the line from Moncton to Winnipeg, with the alternative lines marked upon it.

Of course, this map does not correctly represent the actual location of the line, and is only to be taken as a map to illustrate, in a general way, the conditions that exist. Upon this map will be found marked, by white disks, the various engineering parties which are or have been at work over the line, and by red disks, the various cachés; also warehouses, &c., and the different transportation routes. On it is shown the line surveyed by the Grand Trunk Pacific Railway Company, its deflection toward North Bay and the portion of section 3 which we have accepted; also the portion we have declined to accept.

Looking at this map, the whole situation can be easily appreciated, but if detailed information is required, then reference must be had to the other plans which are submitted herewith.

TRANSPORTATION.

As before stated, the Commission has now a well organized transportation staff, with headquarters at Ottawa, equipped and in a position to deliver all needed supplies required by the parties, all along the line, and we are now in a position to move our supplies into the interior with comparative ease and certainty, although the cost of transportation is, in some sections, heavy.

The transportation through New Brunswick and the eastern end of the province of Quebec, extending as far as the western boundary of district 'B' has been accomplished mostly by teams, and we have met with very little trouble in these districts, except that arising from the unusually heavy snow fall of the past winter.

We experienced a great deal of difficulty, however, in getting supplies up to the north waters of the Ottawa and Gatineau rivers. It was late before we could get our supplies started, after having secured the necessary canoes, boats and men. Our men were overtaken by the ice in some cases, before they had reached the distributing cachés aimed at. The winter transportation up the Gatineau has been conducted by teams as far as the Forks to a large caché there, from which point it has been distributed to the different parties by packers and dog teams. Dog teams have also been employed to advantage up through North Temiskamingue to the east of Lake Abitibi.

In order to get our supplies up to the north and west of Lake Abitibi, we were obliged to cut out forty-six miles of road.

Although the winter has been one of unusual severity, we have had no disasters of any moment, with the exception of the death of Mr. Walter Leamy, who was transport officer up the Temiskamingue route. He went on ahead of his party, looking for the best way for moving his supplies on, and it is supposed that he broke through the ice and was drowned. His death was much regretted by the board, as he was a very competent and energetic officer.

The distance from the end of the railway track at Maniwaki to where the supplies are taken by teams to the Forks of the Gatineau, is about 115 miles. From there to the south line is about 20 miles, and from the south line to the north line is about 50 miles. As there is no road or trail at all from the Forks northward, the difficulty of transporting supplies by dog teams and packers can be appreciated.

One of the greatest obstacles encountered in the transporting of supplies into the interior is the slush upon the lakes. After the lakes freeze up the weight of the first heavy fall of snow sinks the ice; consequently the water overflows it and saturates the

snow, which is turned into slush, and will not freeze except when broken up. This slush will usually not bear the weight of a man, and is sometimes several feet in depth. Each successive fall of snow has the same result, and the lakes are sometimes rendered almost impassable.

SUPPLIES.

Sufficient supplies are now in and stored in places where it was desirable to put them in during the winter, and can be readily distributed to the engineering parties as required through the summer. Wherever canoe and water routes are available, they will be made use of during the coming summer to get in supplies, lasting over the next winter.

In addition to the supplies purchased from the Grand Trunk Pacific Company, which are in the various cachés extending through districts 'F,' 'E,' and a portion of 'D,' we have in now some 249 tons, of which 182.000 lbs. are in district 'E,' 122,000 lbs. in district 'D,' 81,650 lbs. in the Upper Ottawa region of district 'C,' and 113,081 lbs. at the headwaters of the Gatineau, in district 'C.' The detailed location of these supplies is as follows:—

District 'C' (Gatineau River).

	Lbs.
Jumpers Camp, about 23 miles north of the Forks, on N.W. branch	480
Caché between Camp No. 1 and Coukee river, 3 miles south of No. 1	656
Caché at mouth of Coukee river	1,551
Camp No. 2, 35 miles north of the Forks on N.W. branch	5,448
Post Manuan, 5 miles north of Lac des Tombes	4,450
Gatineau Forks depot	100,496
	113,081

Party No. 3 is supplied with provisions to last up to May 1, and will then reach caché No. 2 and Coukee river caché.

Party No. 1 will reach caché No. 2 and Coukee river caché on June 1, and will then be supplied from the Forks and from Post Manuan.

Parties 3 and 4 are not working.

District 'C' (Upper Ottawa).

	Lbs.
Grand Lac Victoria, main depot, for parties 5 and 7	16,491
Bell river caché, for parties 6 and 8	12,659
Parties 5 and 7 supplied up to June 1	.....
Parties 6 and 8 supplied up to July 1	.....
Supplies stored at H. B. post, Grand Lac, for above parties.	30,000
Supplies stored at Moore's Depot for above parties	18,900
Supplies caché́d at Grand Lac Victoria, south end	3,600
	81,650

District 'D' (Abitibi).

	Lbs.
McDougall's Rapids, (for party No. 3) main depot	34,000
McDougall's Rapids, (for party No. 5) Black river caché	26,000
McDougall's Rapids, (for party No. 6) main depot	16,000
N. W. caché, Lake Abitibi (for party No. 4)	36,000
S. W. caché, Lake Abitibi (for party No. 4)	10,000
	122,000

Party No. 1 is supplied with provisions to August 1, 1905.
Party No. 2 is supplied with provisions to July 1, 1905.
Party No. 3 is supplied with provisions to July 15, 1905.
Party No. 4 is supplied with provisions to April 12, 1906.
Party No. 5 is supplied with provisions to January 1, 1906.
Party No. 6 is supplied with provisions to July 1, 1905.

District 'E.'

	Lbs.
Lake Kabinagami en route to caché 9..	62,000
Lake Nipigon en route to Wabinosh and Ombabika posts..	120,000
	182,000

The following is a sample schedule of supplies to a party of eighteen men, showing the allowance per diem, per week and per month:—

—	Daily rations per man, in lbs.	Pounds per Week.	Pounds per Month.
Flour, in bags of 100 lbs	1·20	150	600
Bacon and pork	1 00	125	500
Oatmeal, r. oats and cornmeal	·36	45	180
Beans	·32	40	160
Peas, split	·08	10	40
Tea, black	·06	7	28
Coffee	·04	5	20
Sugar	·40	50	200
Molasses, syrup, 2 gall. per week	·20	25	100
Butter	·16	20	80
Rice	·12	15	60
Cornstarch	·28	02	8
Milk, condensed (¼ can)	·24	30	120
Apples, evaporated, prunes, apricots, raisins and figs	·52	65	260
Salt	·16	20	80
Biscuits, (hard pilot)	·16	20	80
Soap	·06	07½	30
Lime juice, in jars or kegs 2 gall. per month	·04	05	20
Vinegar, ½ gall. per month	—	01¼	15
Pepper, ginger, mustard	—	01	04
Baking powder	—	01	04
Yeast cakes	—	01	04
Candles	—	05	20
Matches	—	01	04
	5·40	651¾	2,617

PARTIES TAKEN OVER FROM THE GRAND TRUNK PACIFIC.

The Commission took over from the Grand Trunk Pacific Company the following parties and at the following times:—

District 'E.'

Party No. 4, Coldwell—From February 21.
Party No. 6, Tempest—From February 21.
Party No. 5, Proctor—From February 21.

District 'F.'

Party No. 7, Macrone—From February 21.
Party No. 8, Heaman—From February 1.
Party No. 9, Darey—From February 1.

We are permanently continuing parties 4 and 6 in District 'E.' Party No. 5 was disbanded on March 26. Parties Nos. 7, 8 and 9, in District 'F,' were disbanded on March 31, March 28 and March 22 respectively.

We, therefore, have only two of the parties in our employ at present of those originally taken over from the Grand Trunk Pacific, the personnel of which have so far proved most satisfactory. As far as we can learn, the chiefs, instrument men and other employees on these parties taken over from the Grand Trunk Pacific, were mostly, if not all, Canadians.

SUPPLIES PURCHASED BY THE COMMISSION.

The food supplied at the different points has given almost universal satisfaction, there being only a few instances where the same proved inferior.

A great deal of trouble, however, was experienced in consequence of the inferior quality of the snow shoes obtained. It was impossible at the time when the Commission started to buy to secure a high grade article, and we were obliged to purchase what we could get. These proved very unsatisfactory and much delayed the work. We are now placing our orders for the snow shoes we will require next winter, and will secure the very best grade.

SECRETARY'S REPORT.

Appended hereto is a report from our secretary, which gives much information regarding the inner workings and business of the Commission, to which is annexed a statement from our chief accountant, showing the receipts, expenditures and liabilities up to February 28, 1905; also a statement showing the expenditures under the different heads from September, 1904, to February 28, 1905; and a statement of expenditures on account of field surveying parties, covering the same date and giving the expenditures by districts; also of the transport service, and a statement showing the deposits to the credit of the Receiver General on account of the National Transcontinental Railway, amounting to $851.91. There is in addition a statement showing the property on hand on February 28, 1905, outside of the property purchased from the Grand Trunk Pacific, and which amounted, as per said statement, to $87,215.57.

When starting to make this report, it was decided to only bring it down to February 28, and the various reports have been made with that end in view. We deem it best, however, to give a financial statement for the month of March, that is, the amount of cash receipts, expenditures and liabilities, which will be found in a supplementary report from the chief accountant, appended hereto.

The Commission has rendered to the railway department monthly accounts, showing the receipts, disbursements and liabilities for each month. These are rendered in duplicate, one set for the department and the other for the auditor general. These statements show in detail every article that has been purchased, and every service that has been rendered and the price paid for same. And in all cases, duplicate certified invoices and vouchers have also been deposited.

The accounting of the Commission is carried on under a modern system, with the ordinary distribution of accounts, and a correct record is being kept of all expenditures, so arranged that there will be no trouble in making a complete audit at any time when required.

SURVEYS.

The preliminary of exploratory surveys in districts 'A' and 'B' have been completed and the parties have been withdrawn from the field.

The Commission is now possessed of sufficient information to enable a decision to be arrived at as to whether the line via Fredericton and the St. John River Valley or the one across the centre of the province should be adopted. It will be some little time before we will have sufficient information to enable a decision to be arrived at

as to whether the line north or south of Lake Abitibi will be preferable, although we have about all the information desirable for that purpose in the eastern portion of district 'B.'

It is proposed to commence location surveys in districts 'A' and 'B' as soon as the local conditions will permit, probably the first week in May. It is expected that location surveys in districts 'A,' 'B' and 'F' will be completed so that tenders may be called for in the early autumn.

PURCHASING DEPARTMENT.

All purchases of every kind are made through our purchasing department, which is under the charge of Mr. A. L. Ogilvie. His instructions are to purchase where he can get the best value and to spread these purchases as equitably as possible over the various provinces. We believe that these instructions have been carried out as faithfully as possible.

At the beginning, and before we had secured the services of Mr. Ogilvie, we had some trouble with parties who endeavoured to exact prices in excess of market rates. We could not, of course, yield to their claims. We believe that, with very few exceptions, the goods furnished us were of excellent quality and the prices were fair and reasonable. This department is working most satisfactorily and we feel that we can safely rely upon getting good value in all cases.

With regard to food supplies, we seek the best quality, as we believe it to be the cheapest in the long run. There has been little or no complaint regarding the quality of food supplied, and we shall endeavour to see that our employees are not furnished with anything of an inferior quality.

MEN EMPLOYED.

So far as we know, all the Commission's employees are British subjects, and all, with very few exceptions, are Canadian born.

We feel confident that we will have a full home supply of both skilled and common labour for the purposes of the work of the Commission.

During the rather hasty marshalling of our forces, we took on a few engineers, instrument men and labourers, who proved to be undesirable. This was to be expected. These have been about all weeded out, and we are confident that we have in our employ to-day, as fine a body of engineers, assistants and men as can be found upon any public work. We have laid down the rule—and will adhere to it—that promotion must be made on merit alone, and in the matter of merit the judgment of the engineers will prevail, in their department.

We found that many of the men who were first hired and went to the interior, were physically unfit, and we decided to require all applicants for positions there to undergo a careful examination here at the hands of our medical examiner. The results have shown the wisdom of this course. The majority of the weaklings and unsound who got upon the works have left, or have been discharged, while those who took their places, and those who have been sent in to other interior places, are all men of good physique and sound bodies. This is a matter of very considerable importance, as it costs from $15 to $20 to get each man into our backwoods. If he is there found unfit, we not only lose that sum, but the effectiveness of the party to which he is attached, is weakened.

MEDICAL ATTENDANCE.

We have only one doctor in the field, who is situated at Grand Lake Victoria, and has the care of four parties, who, with the transporters, will make about 100 men.

Each crew, when going into the field, was supplied with a liberally stocked medicine chest. We felt, however, that in such a remote section as Grand Lake Victoria, it would be well to secure the services of a young doctor, who would be always on call, and who

would in addition, make periodical visits to the various camps, and not only administer to the ailing, but generally inspect the sanitary condition of same.

The experiment has been most satisfactory, and we now purpose, as soon as possible, to place another young doctor upon our line at the head waters of the Gatineau, and one at or near McDougall's Rapids, west of Lake Abitibi. These doctors are supplied with a reasonable stock of medicines and such instruments as they will be likely to require for the operations they may be called upon to perform.

SANITATION.

Our engineers are being furnished with copies of the sanitary regulations of the provinces in which they are operating, and with such additional instructions as are deemed desirable, and everything will be done to preserve the good health of the men in our employ. Of course, when construction begins, it will be necessary to have four or five temporary hospitals along the remote sections. This will be attended to in ample time.

FIRES.

The Commission recognizes the great importance of guarding against forest fires. The most stringent injunctions will be placed upon all men in our employ, requiring the greatest and most intelligent care in the prevention of fires, and in the extinguishing of any that may be started by them, or any one else.

MAILS.

The ordinary mails through districts 'A' and 'B,' aided by the transportmen, gives reasonable facilities to our camps there. We have established a fortnightly service up to the head waters of the Ottawa and Gatineau rivers, and we are arranging to serve all other camps further west once a fortnight, as soon as the conditions will permit, after the lakes break up.

CHARACTER OF THE COUNTRY TRAVERSED.

We are not in a position to report upon the whole country along the line. Some of it has not been traversed by our engineers, and some has only been seen when covered with snow. But of districts 'A' and 'B,' we can speak with certainty. The country there is most valuable and should, beyond question be opened up by railway communication, along the proposed route. The Lake Abitibi region and country extending west is now known to be of a most inviting character. We will not attempt to report upon this, as our information is not definite enough to go into any details.

SPECIFICATIONS, CONTRACTS, ETC.

We deem it desirable that for several months before tenders are invited for construction, the public should have in hand:—

(*a*) The general specifications covering all works.
(*b*) The forms and conditions under which tenders will be asked for.
(*c*) The forms of contract that will be insisted upon.

Considerable correspondence has taken place between the Grand Trunk Railway Company and the Commission, which resulted in the mutual agreement that it would be desirable that there should be uniform specifications on the eastern and western divisions. Our engineers were therefore requested to prepare and submit such specifications. This they have done. We have approved of the same, and a copy will be found appended hereto.

Under clause 7 of the agreement between His Majesty and the Grand Trunk Pacific Railway Company, these specifications have to be submitted to and approved

by said company. This has been done. We have also submitted them to the chief engineer of the Department of Railways and Canals, who, while he is not required to officially pass upon same, has expressed his approval. We, therefore, present these specifications as the general specifications under which the eastern division of the National Transcontinental Railway will be constructed. We also feel sure that they will be adopted upon the western division by the Grand Trunk Pacific Company.

The conditions and form of tender, bond and contract have also been prepared and approved, and accompany this report.

I may say that the approval by the board of the specifications, form and conditions of tender, bond, contract, &c., was not given until the same had been submitted to legal counsel. Of course, it may be found necessary to make some amendments to these papers, but we feel certain that, in the main, they will be adhered to, and certainly any changes will be communicated to the public in ample time. With this information given to the public, at this early date, intending contractors will be given sufficient time to make their calculations.

INFORMATION.

In the past all information has been impartially given to the public, and we propose adhering to this policy in the future, in order that no undue advantage may be accorded any one, but that all competitors may have exactly the same chance, so far as the doings of the Commission are concerned.

TERMINALS AT QUEBEC AND WINNIPEG.

The Commissioners have, as far as possible, familiarized themselves with the country. We have visited Quebec, Edmundston, Grand Falls, Woodstock, Fredericton, Boisetown, St. John, Norton, Chipman, Minto, Moncton and Halifax. We have also spent several days in Winnipeg, studying, with our chief engineer, the conditions there, and at the same time, visited Selkirk and Port Arthur.

It will be necessary in the near future to decide upon the questions involved in connection with the terminals at Quebec and Winnipeg. We will be prepared to give our views when the matter is taken up.

SPECIAL REFERENCE TO LINE SECURED THROUGH NEW BRUNSWICK AND EASTERN QUEBEC.

The Commission feels that it should make special reference to the work which has been accomplished in connection with the surveys from Moncton to Chaudière. It has been asserted and believed for many years that a line could not be secured across the centre of New Brunswick, with grades equal to the Intercolonial Railway, or any grades which at the time of the building of the Intercolonial Railway would have been considered reasonable; also that it was impossible to secure such a line around the corner of the state of Maine, except by such an enormous expenditure as would make it prohibitive.

It was also asserted that it would be necessary to use 1 per cent or heavier grades the remainder of the way to Chaudière.

On the other hand, it was claimed that these difficulties did not exist; that the surveys which had apparently established them had not followed the right direction, or had not exhausted the possibilities of the territory traversed.

In taking up this part of the work, the Commissioners decided to have an exhaustive and minute examination made of this country, and to acquire and present such information as would definitely settle and determine these conflicting contentions. We deemed it best to ascertain beyond doubt which was right and which was wrong in order that the public mind would be set at rest.

To this end we directed our engineers to make the most exhaustive and careful explorations and surveys, so that having before them all that had been written or said they would be able to make complete and decisive reports.

The first of the surveying parties were placed in the field on the 27th day of September last and continued at work through the whole winter (the most rigorous and with the heaviest snow fall in that part of the country within the memory of living man), and as a result we are in a position to state that we have secured a line from Moncton to Chaudière with a maximum grade of ·4 opposed to east-bound freight and ·6 opposed to west-bound freight, and with a maximum curvature of 6 degrees and these only used in a few places.

This line runs all the way through a valuable country, part of which is settled and the remainder is most desirable for settlement, and the opening of which will be of great advantage to the country.

The probably length of this line when finally concluded, if the cross-country route in New Brunswick is adopted, will be shorter than the Intercolonial between the same points, but how much we cannot say until our location surveys have been completed.

If, however, the grades in existence upon the Intercolonial Railway were employed, a saving of at least 90 miles over the I.C.R. by the cross-country route would be effected, and nearly as much by the river route. The value of the road on the lines we have secured and with the grades and curvatures we have obtained may best be understood by a comparison with the Intercolonial with its grades and curves, and in this connection we beg to refer to the calculations contained in the appended report of our assistant chief engineer, Mr. M. J. Butler. from which I will draw a few conclusions.

The same motive power that will haul 660 tons on the Intercolonial will by the line secured haul 1,260 tons going east and 990 tons going west.

If we take the workings of the two roads with ten daily I.C.R. freight trains each way, we find that in 313 working days upon the Intercolonial there would be 4,131,600 pay tons of freight carried, and to haul this number of trains there would be 3,089,310 train miles per year. The cost of this, as per the report of the Intercolonial for 1903, would equal $3,016,711.

The Transcontinental would only have to run (via the centre route) 1,825,415 train miles per year to move the same quantity of freight, and which, at the same cost per train mile as the Intercolonial, would amount to $1,782,518.72.

It will thus be seen that the annual operating cost of the Intercolonial for the said quantity of freight is $3,016,711.21, while that of the Transcontinental will only be $1,782,518.72, a saving in favour of the Transcontinental of $1,237,192.47, which capitalized at 4% per annum equals $30,854,812.25; that is, we claim that the Transcontinental, with its lower grades and curves, the road being equally well constructed with the Intercolonial, will be over $30,000,000 more valuable. With increased business the difference would be much greater.

If, however, we give the Transcontinental ten fully loaded trains per day (of its own) instead of confining it to what would be equal in tons to ten fully loaded trains upon the Intercolonial, the difference would be much greater still and the net annual saving would amount to $2,157,544.52, which capitalized at 4% per annum would give $53,938,613 as the increased value of the Transcontinental low grade line over the Intercolonial.

If the grades are increased to the I.C.R. standard the distance would be reduced on the Transcontinental to 403.7 miles. Taking the same ten trains per day comparison there would be an annual saving in favour of the latter road of $548,937.52, which being capitalized at 4% per annum equals $13,723,438, which represents the increased value of the Transcontinental Railway over the Intercolonial Railway for the handling of that amount of traffic. As the traffic increases, the difference increases.

These calculations have all been made upon the centre line through New Brunswick. They can easily be applied to the other route.

There are sundry other comparisons in the report of Mr. Butler which should be referred to in order to estimate the additional value of the line we are constructing.

It has been suggested that the Intercolonial could be utilized for the eastern section of this line, but the judgment of the Commission is, from the information obtainable, that if it were attempted to lower the grades of the Intercolonial to the standard that we have secured over the Transcontinental, the distance from Chaudière to Moncton would be increased by considerably over 100 miles, and this large section of valuable country would not be opened up.

There are two points on the line between Chaudière and Moncton where it may be found desirable to put in 'pusher' grades of 1 per cent. If this is decided upon a shortening of distance of 25 miles can be secured. It is a mere matter of calculation as to whether it would be more economical or not to put in these grades.

As the heavy through traffic east beyond Quebec will only last about five months of the year, there is much to be said in favour of putting in these two 1 per cent grades.

On the other hand is placed the cost of construction, maintenance and operation all the year round, of 25 miles of line, as against a 'pusher' service at two points for about five months of the year.

We cannot estimate accurately the cost of the proposed line from Moncton to Chaudière, but we think we are safe in stating that it will not exceed an average of $33,000 per mile, and we hope to very considerably reduce this estimate.

EXPENDITURES.

As will be seen by the accompanying statements, we have expended up to the end of March $440,462.03. This leaves only $59,537.97 of the vote of the last session of parliament unexpended.

In addition to this, it will be seen that we had liabilities on March 31 amounting to $175,761.66, and the wages for April will soon be due. The expenditures and liabilities, therefore, exceed the vote. The Commissioners assumed the responsibility of this and to have done otherwise would have virtually stopped the work and have caused great confusion and additional expense.

We, therefore, decided to go on, trusting that parliament would approve of our action and grant the money required.

The following estimate of the supplemental vote required to cover expenditures to June 30, will discharge everything in excess of the present vote of $500,000.

ESTIMATES.

For Current Year.

On March 3, 1905, I wrote you stating in effect that we would require an additional vote of $290,500 to carry us to the end of the fiscal year exclusive of the amount to be paid to the Grand Trunk Pacific Railway Company for surveys, plans, etc., and the cost of their parties in the field from the first day of December up to the time we took them over. It is possible that this amount may not prove sufficient. We are having a careful estimate made up and, if necessary, will revise these figures in the near future.

For 1905-6

For the ensuing year, we estimate that we will require the sum of $1,328,500 to carry on our works. We hope to be in a position to call for tenders early this autumn, in which case we deem it desirable that the sum of $3,000,000 be voted on account of possible payments to contractors.

The said estimate is made up as follows:—

Salaries of commissioners and headquarters staff	$ 100,000
Headquarters, rentals	13,500
Head office stationery, furniture, lights, telephones, telegrams, travelling, incidental and unforeseen expenses.	25,000
Wages	600,000
Head office, district and divisional engineers' salaries	100,000
Supplies and commisariat	425,000
Outfits and instruments	20,000
Freight and travelling expenses of engineers, transportmen and employees	45,000
For payment to contractors	3,000,000
	$4,328,500

In making this report the object of the Commission has been to furnish all information that might be of interest to Parliament and the country. Our affairs will always be kept in such condition that complete and full information can be given at any time when the same is deemed desirable.

In conclusion, permit me to say that we are giving to this great work our best efforts and most careful attention, and we feel confident that we will be able to carry it through to a successful termination. We trust that when our work is ended we will have merited the approval of the people of Canada whose money we are expending.

F. B. WADE,

Chairman, the Commissioners of the Transcontinental Railway.

COPY OF AUDITORS' REPORT.

OTTAWA, February 7th, 1905.

Mr. F. B. WADE, K.C.,
Chairman, the Commissioners of the Transcontinental Railway,
Ottawa, Canada.

SIR,—In conformity with the instructions contained in the letter of the Commissioners, dated the 20th day of January, 1905, the undersigned proceeded the same day to the offices of the Grand Trunk Pacific Railway at Montreal and there, under the supervision of Mr. M. J. Butler, assistant chief engineer, made a complete audit of the expenditure of said company for the surveys made on the main line from Winnipeg, eastward, to the eastern end of party No. 3.

The requisitions for supplies and equipment furnished were duly compared with the accounts submitted and also with the freight bills for same, and with the ledger and other books of the Grand Trunk Railway system, and the vouchers were duly verified with the following results:—

The total amount of such expenditure, including interest at four per cent (4%) to November 30th, 1904, is $318,308.24, as per schedule annexed marked 'A.' But as your Commission has decided to take over all the supplies of party No. 3 and to assume one-fifth only of the remaining cost of such party, the total amount to be paid to the Grand Trunk Pacific Railway will be $289,863.67, as per statement annexed marked 'B.' In case your Commission decides to assume the entire cost of said party No. 3 the additional amount to be paid to the Grand Trunk Pacific Railway therefor will be $28,444.57.

The undersigned also submit the following additional statements:—

List 'C.'—Statement showing engineering camp equipment and supplies on hand on the 30th day of November at the various cachés or elsewhere, with cost of same, including freight and transport.

List 'CC.'—Statement showing supplies on hand and cost of same at cachés 8a. 9, 9a, 10, 10a, 11, 11a, 12, 13, 13a, 14, 15, 16, 18, 19, 20, 21, and with parties 4, 5, 6, 7.

List 'D.'—Showing principal articles of engineering and camp equipment purchased by the Grand Trunk Pacific Railway in connection with surveys on the main line east of Winnipeg, also quantity on hand November 30th, 1904, as per their inventory.

List 'E.'—Statement showing equipment on hand in division engineer's office at North Bay and in district engineer's office, Nipigon.

List 'F.'—Statement showing dog feed on hand at various points.

List 'G.'—Statement showing engineering equipment, stationery, camp and kitchen equipment with parties 8 and 9.

List 'H.'—Statement showing equipment and supplies on hand at White Dog and Eagle River cachés.

List 'K.'—Statement showing basis for pro-rating salaries of assistant chief engineer and divisional engineers.

List 'L.'—Statement giving names of district and assistant engineers employed on main line, east of Winnipeg.

List 'M.'—Statement showing total cost of party No. 3 to November 30th, 1904; also amount chargeable to Transcontinental Commission should the Commissioners take over only one-fifth of same.

The whole respectfully submitted,

KENT & TURCOTT,
Wm. AINSLIE,
G. A. BELL.
} Auditors.

GRAND TRUNK RAILWAY SYSTEM.

STATEMENT of amounts expended on surveys of the National Transcontinental Railway east of Winnipeg to November 30, 1904.

Date.	No.	Name.	For.	Amount.
1903.				$ cts.
Feb. 26..	3917	Stephens, J. R..	Proportion of salary.....	133 92
	53	Pay roll.....	" office staff.....	4 17
Mch. 31.	8921	Hill, C. C.....	Expenses	9 65
	7156	Stephens, J. R.....	Proportion of salary.....	416 66
	31	Pay roll.....	"	106 67
	628½	"	Survey parties.....	146 78
	3 B.	Transfer.....	Supplies	6 88
	15 A.	"	Stationery.....	43 52
Apl. 30..	11849	McKeown, D. J.....	Freight charges.....	22 62
	11904	Knowlton, G. A.....	Proportion of expenses.....	9 57
	10666	Stephens, J. R.....	" salary.....	416 66
	31	Pay roll.....	" office staff.....	106 67
	887⅕	"	Survey parties.....	470 71
	10730	Kyle, G. A.....	Salary.....	311 11
	10731	Knowlton, G. A.....	Proportion of salary.....	60 00
	12740	Hill, C. C.....	Expenses.....	9 22
	12800	Stephens, J. R	Proportion of expenses	24 51
	12801	"	"	39 38
	3 B.	Transfer.....	Supplies.....	1,652 06
	15 A.	"	Stationery.....	48 58
May 31..	15225	C. P. Railway.....	Freight charges	100 00
	14166	Stephens, J. R.....	Proportion of salary.....	416 66
	14167	Kyle, G. A.	Salary.....	333 33
	14168	Knowlton, G. A.....	Proportion of salary.....	200 00
	33	Pay roll	" office staff	106 67
	1543 to 1545	"	Survey parties	1,344 37
	1546 to 1547	"	"	1,268 93
	16679	Hudsons Bay Co.....	Securing men.....	20 05
	16680	"	Material, etc.....	91 75
	16690	"	Use of team and man.....	4 50
	3 B.	Transfer.....	Supplies.....	30 00
	15 A.	"	Stationery.....	111 01
June 30..	18155	Knowlton, G. A.....	Proportion of expenses.....	157 97
	18154	Hill, C. C.....	Expenses.....	145 33
	18156	Kyle, G. A.....	"	137 09
	18157	McCarthy, W.....	"	17 00
	18158	Nutting, M. E.....	"	93 00
	18159	Rice, G. M.....	"	108 90
	18186	Kyle, G. A.....	"	14 00
	18229	McKeown, W. J.	Freight charges..	56 31
	19028	Rice, G. M..	Expenses.....	62 75
	19127	Allan, A. G.....	"	8 10
	19147	Kyle, G. A.....	"	169 73
	19151	Mayer, W	"	211 04
	19133	DeMorest & Sylvester...	Maps.....	10 00
	20013	Knowlton, G. A.... ..	Proportion of expenses.....	249 95
	20209	McCool, P.....	Proportion of rent of N. Bay Office.....	13 33
	20287	C. P. Railway.....	Freight charges.....	64 00
	20393	Bawlf, R.....	Rent of Winnipeg office.....	30 00
	20901	International Hotel.....	Board of M. E. Nutting and party....	40 50
	20902	Nutting, M. E.....	Paid Hudsons Bay Co. for supplies.....	156 13
	20821	Canada Fish Co.....	Use of boats, etc.....	80 00
	20822	"	Supplies.....	3 75
	21445	Hudson's Bay Co.....	.....	19 25
	18077	Stephens, J. R.....	Proportion of salary.....	416 66
	18078	Knowlton, G. A.....	"	200 00
	18079	Kyle, G. A..	Salary.....	333 33
	33	Pay rolls.....	Proprotion of salary of office staff.....	118 33
			Carried forward.....	.....

SESSICNAL PAPER No. 62c

GRAND TRUNK RAILWAY SYSTEM—*Continued.*

STATEMENT of amounts expended on surveys, &c.—*Continued.*

Date.	No.	Name.	For	Amount.
				$ cts.
			Brought forward.....	....
1903.				
June 30..	1541 to 1547	Pay rolls	Survey parties.....	5,163 28
	3 B.	Transfer.....	Supplies.....	7,586 64
	15 A.	"	Stationery.....	14 42
	20795	Bourke, J.....	Proportion of electric light, North Bay office	1 20
July 31..	22119	Hill, C. C.....	Expenses.....	5 15
	22122	Stephens, J. R.....	Proportion of expenses.....	39 58
	22206	Canada Fish Co.....	Supplies, &c.....	60 45
	22215	Stephens, J. R.....	Proportion of expenses.....	59 07
	23289	Hill, C. C	Expenses.	116 71
	23290	Knowlton, G. A.....	Proportion of expenses.....	107 05
	23291	"	"	32 68
	23292	Kyle, G. A..	Expenses.....	76 57
	23293	McCool, P..	Proportion of rent of North Bay office....	20 00
	23294	Canadian Pacific Ry . .	Freight charges.....	37 28
	23296	"	"	317 40
	23297	McKeown, D. J	"	132 00
	23784	Mayer, W.....	Expenses.....	42 24
	23785	Nutting, M. E..	"	124 92
	23786	Ord, L. R.....	"	92 13
	23068	Hudson's Bay Co.....	Use of canoes, &c..... ...	50 94
	24101	"	Teaming, &c..... ...	21 00
	24102	"	Supplies.....	241 53
	24882	Austin, J. McN	"	408 69
	22201	Stephens, J. R..... .	Proportion of salary.....	416 66
	22202	Knowlton, G. A.....	"	200 00
	22203	Kyle, G. A.....	Salary.....	333 33
	33 & 1554-1560....	Pay rolls.	Proportion of salary of office staff & survey parties	4,809 98
	3 B.	Transfer.....	Supplies..	4,907 70
	15 A.	"	Stationery.....	23 96
Aug. 31..	25693	Agent, North Bay	Freight charges.....	212 60
	25775	Bell Tel. Co	Rental of tel., G. A. Kyle's office.....	29 15
	25776	Bawlf, N.....	Rent of Winnipeg office.	30 00
	25876	Austin, J. McN	Supplies	32 58
	25099	Bourke, J	Proportion of light, North Bay office....	1 80
	25874	Hudson's Bay Co	Supplies	220 85
	26580	Sisters of Providence....	Board of D. D. Rankin..	19 00
	26577	Drs. Edmison & Laidlaw	Attendance on D. D. Rankin.	25 00
	27061	Allen, A. G.....	Expenses.....	14 35
	27062	Brennan, M. & Co .	Blankets....	71 25
	27063	Bourke, J.....	Proportion of light, North Bay office... ..	1 80
	27064	Bawlf, N..... .	Rent of Winnipeg office.....	30 00
	27065	Hudson's Bay Co.	Supplies...	109 50
	27066	"	"	554 70
	27068	"	"	10 50
	27069	"	"	89 35
	27070	"	Expenses....	50 13
	27072	Knowlton, G. A.....	Proportion of expenses.....	52 74
	27073	"	Disbursements.....	141 39
	27074	Mayrand, G. C.....	Expenses.....	22 20
	27076	McDonald & Hay. . . .	Supplies.....	73 25
	27077	McLellan, A.....	Expenses..	304 10
	27078	Ord, L. H	"	179 40
	27716	Kyle, G. A.....	"	113 94
	28304	Mayer, W..	"	50 50
	28804	C. P. Railway....	Freight charges....	96 00
	25864	Stephens, J. R..... ...	Proportion of salary.....	416 66
	25865	Knowlton, G. A.....	"	200 00
	25866	Kyle, G. A.....	Salary.....	333 33
1605–1620	Pay rolls....		Survey parties	11,570 18
	33	"	Proportion of salary of office staff.....	96 24
	3 A.	Transfer.....	Supplies.....	4,236 10
	15 A.	"	Stationery....	136 99
			Carried forward.....	

GRAND TRUNK RAILWAY SYSTEM—*Continued.*

STATEMENT of amounts expended on surveys, &c.—*Continued.*

Date.	No.	Name.	For.	Amount.
1903.				$ cts.
			Brought forward	
Sept. 30..	31316	Allan, A. G	Expenses	47 55
	31325	Hill, C. C	"	65 70
	31328	Kyle, G. A	"	69 29
	31329	"	"	88 08
	31330	"	Proportion of expenses	166 66
	31332	Mayer, W	Expenses	203 51
Sept	31445	Nutting, M. E	Expenses	297 50
	31452	Agent, North Bay	Freight charges	50 00
	31343	Austin, J. Mc N	Supplies	260 37
	31345	Hudson's Bay Co	"	56 00
	31346	"	"	113 00
	31347	"	"	328 55
	31348	"	"	93 03
	31349	"	"	150 79
	31350	"	"	215 09
	31351	McCool, P	Proportion of rent, North Bay office	20 00
Aug	31352	"	" "	20 00
Sept. ...	31354	Ord, L. R	Expenses	50 85
	31747	Knowlton, G. A	Proportion of expenses	49 27
	31848	"	"	227 72
	32791	Austin, J. McN	Supplies	142 88
	32795	Canada Fish Co	Hire of boat	30 00
	32797	Hudson's Bay Co	Supplies	105 60
	32824	McKnewn, D. J	Services rendered	25 00
	29675	Stephens, J. R	Proportion of salary	273 46
	29676	Knowlton, G. A	"	200 00
	29677	Kyle, G. A	"	266 67
	33	Pay rolls	Proportion office staff	76 56
	1639–1655	"	Survey parties	10,464 43
	3 A.	Transfer	Supplies	3,728 89
	15 A.	"	Stationery	47 45
Oct. 31..	32838	Geological Survey	Canoe purchased	35 00
	33842	Bourke, J	Proportion electric light, North Bay office.	1 80
	33844	Hudson's Bay Co	Building storehouse	195 98
	33845	"	Freighting supplies	343 00
	33846	McGill University	Tests of barometers	15 00
	34325	Hudson's Bay Co	Supplies	127 83
	34038	Hogan, W	Board of men	35 50
	34040	Agent, North Bay	Freight charges	1 74
	34365	Hudson's Bay Co	Transporting supplies	11 45
	34364	"	Handling and freighting	1,797 15
	34363	"	Storage	14 09
	34366	McCarthy, W	Expenses	175 06
	36246	Austin, J. McN	Provisions	21 02
	36248	Bourke, J	Proportion electric light, North Bay office	1 80
	36250	Donovan, D	Cartage	3 15
	36255	Hudson's Bay Co	" &c	40 33
	36256	Kyle, G. A	Proportion of expenses	156 08
	36257	Knowlton, G. A	"	44 89
	36258	"	"	185 44
	36259	Mayer, W	Expenses	26 60
	36264	McCool, P	Proportion of rent, North Bay office	20 00
	36265	Nutting, M. E	Expenses	21 15
	36266	Ord, L. R	"	131 50
	36267	Pim, J. P	"	191 53
	36948	Ward, E	Proportion of rent, Winnipeg office	58 50
	33776	Stephens, J. R	Proportion of salary	273 46
	33778	Knowlton, G. A	"	200 00
	33777	Kyle, G. A	"	133 34
	33	Pay roll	Proportion of salary office staff	130 33
	1647–1664	"	Survey parties	8,683 45
			Carried forward	

SESSICNAL PAPER No. 62c

GRAND TRUNK RAILWAY SYSTEM—*Continued.*

STATEMENT of amounts expended on surveys, &c.—*Continued.*

Date.	Number.	Name.	For.	Amount.
1903.				$ cts.
			Brought forward	
	3 A.	Transfer.....	Supplies.....	4,451 08
	15 A.	"	Stationery.....	401 78
Nov. 30..	37408	Allan, A. G	Supplies.....	234 10
	37409	Hudson's Bay Co.....	Repairing roof of Cache.....	6 70
	37410	"	Provisions.....	404 71
	37411	Kyle, G. A	Freight charges paid.....	127 24
	37535	Hudson's Bay Co.....	Use of tents.....	15 00
	37536	"	" etc.....	64 43
	37537	"	" "	70 55
	37538	"	" "	87 80
	37539	"	" "	148 50
	37957	"	Wages of boatmen, &c	816 50
	37958	"	"	78 00
Nov. 30..	37959	Hudson's Bay Co	"	324 50
	37960	"	"	390 00
	38208	"	Building dwelling house.....	84 82
	38112	"	Use of canoes.....	59 40
	38209	Ward, E.	Proportion of rent, Winnipeg office.....	45 00
	39470	Allen, A. G	Disbursements.....	31 20
	39471	Bourke, J	Proportion electric light, North Bay office.	1 80
	39475	Bell Telephone Co	Rent of telephone, Winnipeg office.....	15 80
	39478	Kyle, C. A.....	Freight charges.....	9 53
	39479	"	Proportion of expenses.....	51 46
	39480	Knowlton, G. A	Disbursements.....	69 64
	39481	"	Proportion of expenses.....	6 87
	39485	Mann, W.	Disbursements.....	106 55
	39486	McCool, P.	Proportion of rent, North Bay office.....	20 00
August ..	39489	Stephens, J. R.....	Proportion of expenses.....	71 15
September	39490	"	"	28 45
October ..	39491	"	"	27 25
November	39492	"	"	19 11
	39773	Hudson's Bay Co	Freight charges.....	8 20
	39774	"	"	20 35
	33	Pay-roll	Proportion of salary, office staff.....	140 00
	1636–1652	"	Survey parties.....	5,153 88
	37611	Stephens, J. R....	Proportion of salary.....	273 46
	37612	Kyle, G. A.....	"	133 34
	37613	Knowlton, G. A	"	200 00
	3A	Transfer.....	Supplies.....	1,989 15
	15A	"	Stationery.....	88 40
Dec. 31..	41062	McDougall, W. H ...	Express charges.....	3 00
	41196	Hudson's Bay Co	Freight charges	49 00
	41197	"	Payments made.....	28 00
	41753	Knowlton, G. A	Proportion of expenses.....	52 13
	41754	"	" disbursements	349 70
	41756	Ward, E.	" rent, Winnipeg office..	45 00
	42398	Bourke, J	" electric light, North Bay office	1 80
	42399	McCool, P.....	" rent, North Bay office.....	20 00
	42407	Donovan, D.....	Cartage.....	7 20
	42408	Austin, J. McN	Provisions.....	11 48
	33	Pay rolls.....	Proportion of salary, office staff.....	124 39
	1621–1642	"	Survey parties.....	12,202 31
	40820	Stephens, J. R.....	Proportion of salary.....	243 06
	40821	Kyle, G. A.....	"	166 66
	40822	Knowlton, G. A	"	200 00
	3A	Transfer.....	Supplies.....	1,929 06
	43268	Griffith, G. L..	Disbursements.....	62 77
	43270	Heaman, J. A	"	41 25
	43271	Hudson's Bay Co	Canoe rental, &c....	6 75
	43272	"	Freighting supplies.....	167 50
	43273	"	Cash and goods	321 00
	43275	"	Disbursements...	28 70
	43276	"	Paid messenger	3 00
			Carried forward..	

GRAND TRUNK RAILWAY SYSTEM—*Continued.*

STATEMENT of amounts expended on surveys, &c.—*Continued.*

Date.	No.	Name.	For.	Amount.
				$ cts.
			Brought forward.....	.....
1903.				
	43277	McDougall, W. H	Care of dogs, &c.....	8 60
	43278	McCarthy, W	Disbursements.....	71 29
	43283	Spruce, S.....	Board of teams.....	40 75
	15A	Transfer.....	Stationery.....	35 39
1904.				
Jan. 31..	612	Goodman, H. M.....	Proportion of expenses.....	3 75
	741	Agent, North Bay	Freight charges.....	11 10
	814	Canada Fish Co.....	Board.....	124 15
	815	Kyle, G. A.....	Disbursements.....	80 12
	825	Fraser, W.....	Board.....	149 24
	1000	Black, T.....	Storage.....	20 00
	2311	Agent, North Bay	Freight charges.....	1 80
	2312	Pim, J. P	Disbursements.....	180 50
	2141	Bourke, J	Proportion electric light, North Bay office.	2 86
	2145	Knowlton, G. A	Disbursements	210 71
	2146	"	Proportion of expenses.....	26 78
Jan.	2147	McDougall, W. H	Express charges.....	22 45
	2149	McCool, P.....	Proportion of rent, North Bay office.....	23 81
	2150	McLellan, A.....	Disbursements.....	172 80
	2151	Nutting, M. E.....	"	12 00
	2154	Heaman, J. A	"	20 60
	2155	Hudson's Bay Co..	Cartage, &c.....	253 68
	2156	"	Supplies, &c.....	36 10
	2157	"	Telegrams, &c.....	8 00
	2158	"	Sundries	12 50
	3261	Kyle, G. A.....	Proportion of expenses.....	29 99
	3262	Kenny, F. L.....	Painting level rods.....	10 00
	3265	Poile, Mrs.....	Meals.....	62 00
	3266	Shelling, H.....	Dogs, &c	48 00
	3314	Hogan, W.....	Board.....	43 05
	3315	Hudson's Bay Co	Meals, &c.....	16 85
	2650	McDonald, D.....	Feeding dogs.....	10 00
	548	Stephens, J. R.....	Proportion of salary.....	243 06
	549	Kyle, G. A.....	"	95 24
	550	Knowlton, G. A	"	238 06
	1653 to 1656	Pay rolls.....	Survey parties.....	4,011 58
	1658	"	"	353 58
	1662 to 1665	"	"	3,861 15
	33	"	Proportion of salary, office staff	124 45
	3A.	Transfer	Supplies.....	1,977 61
	15A.	"	Stationery	62 65
Feb. 29..	3609	Boucher, C. R	Disbursements,.....	36 60
	3610	Black, T.....	Proportion of rent, warehouse.....	20 00
	3613	Ward, E.....	Proportion of rent, Winnipeg office.....	25 72
	3983	Town of North Bay.....	Water supply.....	3 06
	4025	Hudson's Bay Co.....	Cash for fares.....	5 55
	4158	"	Tents, &c.....	36 00
	4159	"	Rent of canoes.....	63 00
	4160	"	Packing supplies	7 00
	4161	"	Transporting supplies	378 00
	4162	"	Rent.....	30 00
	4163	"	Carrying letter.....	45 00
	4164	"	Freight charges.....	258 75
	4165	Kyle, G. A.....	Disbursements.....	1 20
	5431	Heaman, J. A.....	"	124 20
	5432	Hudson's Bay Co.....	Sundries	87 39
	5435	"	Freight and express.....	3 28
	5442	Tilden, B. P.....	Disbursements.....	1 35
	5443	Ward, E.....	Proportion of rent, Winnipeg office.....	25 72
	5535	Kyle, G. A.....	Disbursements.....	73 14
			Carried forward.....	.....

SESSICNAL PAPER No. 62c

GRAND TRUNK RAILWAY SYSTEM—*Continued.*

STATEMENT of amounts expended on surveys, &c.—*Continued.*

Date.	Number.	Name.	For.	Amount.
				$ cts.
			Brought forward.....	.....
1904.				
	6253	Agent, North Bay ..	Freight charges.....	5 22
	6255	Balloch, G. R.....	Disbursements.....	67 20
	6256	Bourke, J	Proportion of el. light, North Bay office...	2 86
	6258	Hudson's Bay Co.....	Freight charges.....	36 39
	6261	Knowlton, G. A	Disbursements.....	267 79
	6262	" . .	Proportion of expenses.....	51 21
	6263	McCool, P.....	Proportion of rent, North Bay office....	23 81
	6516	Hudson's Bay Co.....	Teaming....	36 12
	6517	International Hotel.....	Board.....	109 30
	3701	Stephens, J. R.....	Proportion of salary.....	218 75
	3702	Kyle, G. A.	"	95 24
	3703	Knowlton, G. A	"	238 09
	33	Pay roll.....	" office staff	112 00
	1680 & 1681	"	Survey parties.....	2,283 21
	1682	"	"	465 19
	1684 & 1685	"	"	2,558 33
	1686	"	"	357 40
	1687	"	"	1,024 48
	3B.	Transfer.....	Supplies.....	3,903 05
	15A.	"	Stationery.....	168 30
Mar. 31..	6787	Hudson's Bay Co.....	Freight charges.....	2 85
March 31.	6788	Poile, Mrs. E.....	Board	51 00
	7257	Hudson's Bay Co.....	Freight charges.....	60 14
December	7258	Stephens, J. R..	Proportion of expenses.....	34 30
	7259	"	"	43 75
January	7285	Hudson's Bay Co..	Express charges	4 60
and	7545	Mellen, W. E.....	Proportion of extra services	27 23
February.	9098	Bourke, J	Proportion of electric light, North Bay office	2 86
	9099	Black, T.....	Storage	20 00
	9103	Hannington, C. F ...	Disbursements.....	101 20
	9104	Heaman, J. A	"	2 00
	9106	Hudson's Bay Co.. ...	Cash paid	3 00
	9109	Kyle, G. A..	Disbursements.	93 42
	9111	Kenny, F. L..	Painting rods.....	10 00
	9113	McLellan, A.....	Disbursements.....	105 64
	9117	McCool, P.....	Proportion of rent, North Bay office.....	23 81
	9118	Nutting, M. E	Disbursements.....	161 95
	9120	Pim, J. P	"	54 55
	9126	Unwin, &c	Copy of field notes.....	12 00
	9127	Ward, E	Proportion of rent, Winnipeg office.....	25 73
	9128	Hudson's Bay Co	Cash paid.....	26 05
	9547	Balloch, G. R.....	Disbursements.....	277 36
	9548	Knowlton, G. A	Porportion of expenses.....	190 42
	9549	"	Disbursements.....	222 57
	9551	Nutting, M. E.....	"	117 58
	9874	Hudson's Bay Co	Freight charges.....	48 65
	7133	Stephens, J. R.....	Porportion of salary	218 75
	7134	Kyle, G. A.....	"	95 25
	7135	Knowlton, G. A	"	238 08
	7141	Hannington, C. F.....	Salary	250 00
	33	Pay rolls.....	Porportion of salary, office staff.....	112 00
	1641	"	Survey parties.....	285 72
	1644 to 1650	"	"	8,876 37
	1651	"	"	184 28
March 31.	1654 to 1656	"	"	3,390 77
		Transfer...	Supplies.....	1,486 81
		.....	Stationery.....	44 46
April 30..	10744	Quinn, T. J	Board, &c.....	5 50
	11047	Fraser, W.....	Supplies, &c...	97 96
	11048	Hannington, C. F	Disbursements.....	56 50
	12536	Agent, North Bay	Freight charges.....	14 02
	12542	Ahlstrom, N. E.....	Clearing sleigh trail.....	25 00
			Carried forward.....	.....

GRAND TRUNK RAILWAY SYSTEM—*Continued.*

STATEMENT of amounts expended on surveys, &c.—*Continued.*

Date.	No.	Name.	For.	Amount.
1904.				$ cts.
			Brought forward....	.....
	12543	Black, T.	Storage	10 00
	12544	Chapman, C	Cache keeping.....	25 00
	12547	Hudson's Bay Co	Use of camp.....	5 00
	12548	"	Messenger service.....	12 00
	12549	"	Sundries	8 40
	12550	"	"	17 45
	12551	" ...	Taking dogs to Dinorwic.....	21 26
	12552	"	Supplies, &c.....	19 44
	12553	Jackson, R.....	Freight charges.....	7 61
	12557	McCool, P..	Proportion of rent, North Bay office....	23 81
	12558	Bourke, J	Proportion of electric light, North Bay office.....	2 86
	12559	McDougall, W. H	Clearing river	120 00
	12560	Ross Canoe Co.....	Canoes...	106 00
	12563	Ward, E	Proportion of rent, Winnipeg office....	25 73
	13104	Hudson's Bay Co..	Teaming.....	63 20
	13105	Heaman, J. S.....	Disbursements.....	34 35
	13108	Kyle, G. A.	"	71 28
	13109	Knowlton, G. A.....	"	46 68
	13110	"	Proportion of expenses.....	35 11
	13111	Ord, L. R.....	Disbursements..	53 04
	13097	Balloch, G. R..... ...	"	12 90
	13099	Barnhill, B. E	"	29 52
	13101	Fraser, W.....	Storage	2 00
	13102	Hudson's Bay Co	Cash paid.....	2 00
	13161	"	Sundries	15 50
April 30..	13162	Hudson's Bay Co.....	Sundries.....	1 95
	13163	Ross Canoe Co.....	Canoe	59 00
	13199	Locke, Rupert..... ..	Disbursements.....	23 30
	10573	Stephens, J. R.....	Proportion of salary.....	218 75
	10574	Kyle, G. A.....	"	95 25
	10575	Knowlton, G. A.....	"	238 08
	10581	Hannington, C. F.....	Salary....	250 00
	33	Pay roll.....	Proportion of salary, office staff	113 75
	1397	"	Survey parties..	237 86
	1399 & 1400	"	"	1,484 40
	1401 & 1402	"	"	1,862 58
	1403	"	"	181 43
	1404 & 1405	"	"	1,997 30
	3A	Transfer..... ...	Supplies.....	11,715 07
	15A	"	Stationery.	90 16
May 31..	13660	Hudson's Bay Co.....	Feed for dogs.....	55 62
	13661	"	Freighting	1,740 00
	13662	"	Express charges	3 50
	13663	"	Building warehouse..	876 98
	13664	"	Freighting	650 00
	13931	Knowlton, G. A.....	Expenses.	247 77
	13923	Hudson's Bay Co..	Freight charges.....	3 82
	13925	"	"	228 43
	13929	Unwin, Murphy, &c....	Copy of field notes.....	17 00
	14053	Canada Fish Co.....	Boat hire.....	585 00
	14208	Miller, J.....	Labour....	22 45
	14209	Poile, Mrs	Board	11 00
	14417	Hudson's Bay Co.....	Supplies.....	54 68
	14418	"	Sundries	24 00
	14420	"	"	12 45
	14422	Agent, North Bay	Freight charges.....	12 52
	14423	"	"	1 67
	14510	Bourke, J	Proportion of electric light, North Bay office	2 86
	14511	Fraser, Wm..... . .	Board...	12 25
	14512	"	Storage	2 00
	14513	Hudson's Bay Co..	Freight charges.....	95 65
	14514	"	Cash, getting dogs.....	1 50
			Carried forward.....	

GRAND TRUNK RAILWAY SYSTEM—*Continued.*

STATEMENT of amounts expended on surveys, &c.—*Continued.*

Date.	No.	Name.	For.	Amount.
1904.				$ cts.
			Brought forward.....	.....
	14515	McCool, P.....	Proportion of rent, North Bay office.....	23 81
	14516	McDougall, W. H	Building warehouse.....	200 00
	14517	Nelson, J. D	Disbursements.....	250 89
	14914	Chambers, T.....	Freighting	46 00
	14917	Quinn, T. J.	Board	13 00
	15653	Bell Telephone Co.....	Telephone rent.....	4 29
	15656	Knowlton, G. A	Disbursements...	69 23
	15657	"	Proportion of expenses.....	78 04
	16610	Fraser, Wm.....	Board	21 00
	16611	Gailor, C. F.....	Disbursements..... ...	40 50
	16612	Hudson's Bay Co.....	Freight charges..... ...	238 06
	16613	"	"	10 93
	16614	Hannington, C. F.....	Disbursements.....	94 54
.....		Supplies transferred from Thunder Bay branch..	.....	4,006 55
	14424	Ward, E..... .. .	Proportion of rent, Winnipeg office.	25 73
	33	Pay roll.....	" of salary, office staff.....	97 50
	1413	"	Survey parties.....	236 58
	1416 & 1417	"	"	2,426 26
	1418–1421	"	"	3,659 12
	1422	"	"	95 55
	1423	"	"	1,103 86
	14018	Stephens, J. R.....	Proportion of salary	187 50
	14019	Kyle, G. A.	"	47 62
	14020	Knowlton, G. A	"	238 03
	14026	Hannington, C. F.	Salary	250 00
	3E	Transfer.....	Supplies.....	4,601 52
	15A	"	Stationery.....	97 60
June 30..	17162	Barnhill, B. E.....	Disbursements.....	37 19
	17163	Black, T.....	Rent.	11 00
June 30...	17164	C. P. Ry.....	Freight charges.....	18 00
	17167	Dominion Exp. Co ...	Express "	30 00
	17168	Henderson, J.. ..	Board	18 00
	17171	Hudson's Bay Co.....	Freight charges..... ..	5 66
	17173	"	"	656 05
	17176	Kyle, G. A.....	Disbursements	24 90
	17178	Mellen, W. E.....	Proportion special services.....	25 00
	17179	Miller, J.....	Express charges.....	1 50
	17180	Ord, L. R..... ...	Disbursements..... ...	28 40
	17760	Agent, North Bay.	Freight charges..... ...	17 28
	17761	Gzowski, C. S..... ...	Disbursements.....	23 53
	17762	Hannington, C. F..	"	31 70
	17763	"	"	21 85
	17764	Hudson's Bay Co.....	Sundries	6 00
	17765	"	"	15 00
	17766	"	"	55 94
	17769	Miller, J.....	Charges on dogs.....	2 90
	17770	Pim, J. P.....	Disbursements.....	169 94
	17771	Tempest, J. S.....	"	83 95
	17772	Usborne, W..... ...	"	76 61
	18821	Bourke, J.....	Proportion of electric light, North Bay office	2 86
	19001	Gailor, C. F.....	Disbursements.....	14 30
	19002	Hudson's Bay Co.....	Storage	5 00
	19003	"	Freight charges.....	92 79
	19004	"	Expenses of guide..... ..	8 00
	19006	McCool, P.....	Proportion of rent, North Bay office.....	23 80
	19956	Ahlstrom, N. E.....	Hire of dogs.....	102 95
	19957	"	Care "	37 50
	19958	Cobb, W. H.....	Transportation of supplies	278 10
	19962	Knowlton, G. A.....	Proportion of expenses.....	74 71
	19961	Hudson's Bay Co.....	Sundries	8 44
	19963	Knowlton, G. A.....	Disbursements.....	53 75
			Carried forward.....	

GRAND TRUNK RAILWAY SYSTEM—*Continued.*

STATEMENT of amounts expended on surveys, &c.—*Continued.*

Date.	No.	Name.	For	Amount.
1904.				$ cts.
			Brought forward.....	.....
	19964	Newton, J. S.....	Fish	4 20
	19965	Poiles, Mrs.....	Board	6 75
	19966	Pim, J. T.....	Disbursements.....	7 50
	19967	Ward, E.....	Proportion of rent, Winnipeg office.....	12 85
	17051	Stephens, J. R.....	Proportion of salary.....	167 50
	17052	Kyle, G. A.....	"	47 62
	17053	Knowlton, G. A.....	"	238 08
	17059	Hannington, C. F.....	Salary	250 00
	18591	Kelliher, B. B.....	Proportion of salary.....	27 39
	32	Pay roll.....	" office staff.....	97 50
	1452	"	Survey parties.....	232 00
	1453 & 1454	"	"	1,438 54
	1457–1462	"	"	5,047 13
	1463	"	"	149 10
	1464	"	"	1,140 00
	3 B	Transfer.....	Supplies.....	4,938 04
	15 A	"	Stationery.....	127 70
July 31...	20139	Kelliher, B. B.....	Disbursements.....	36 75
	20144	Ord, L. R.....	"	60 53
May & April..	21121	Stephens, J. R.....	Proportion of expenses.....	71 29
	21122	"	"	85 33
June.....	21120	Austin, J. McN.....	Freighting supplies.....	2,041 60
	21130	"	Board	29 70
	21131	"	Constructing cabin.....	150 00
	21133	Boucher, C. R	Level rod.....	10 00
	21134	Caldwell, R. W.....	Disbursements.....	23 89
	21135	Henderson, J.....	Board.....	22 50
	21136	Hudson's Bay Co....	Freight supplies.....	6 25
	21137	Tempest, J. S.....	Railway tickets.....	48 60
	22281	Bourke, Jno.....	Proportion of electric light, North Bay.....	2 85
	22282	Black, J.....	Rent.....	10 00
	22287	Gzowski, C. S., jr.....	Disbursements.....	37 86
	22288	Hudson's Bay Co.....	Supplies.....	13 00
	22290	Hudson's Bay Co.	Sundries.....	236 00
July 31..	22291	"	Haulage of supplies.....	414 00
	22293	Hannington, C. F. ..	Disbursements	38 65
	22298	Mitchell, C. A.....	"	21 45
	22299	McCool, P.....	Proportion of rent, North Bay office	23 80
	22300	Ord, L. R.....	Disbursements	35 37
	22306	Ward, E.	Proportion of rent, Winnipeg office	12 86
	22874	Knowlton, G. A.....	Proportion of expenses.....	84 14
	22875	"	Disbursements	110 33
	23259	Usborne, W.....	"	40 05
	23263	Hudson's Bay Co	Services of Indian.....	3 10
	20818	Stephens, J. R.	Proportion of salary	187 50
	20819	Knowlton, G. A.....	"	238 08
	20823	Hannington, C. F....	Salary	250 00
	20824	Kelliher, B. B	Proportion of salary	35 70
	20827	Kyle, G. A.....	"	47 62
	32	Pay roll.....	Proportion of salary office staff.....	129 96
	1498	"	Survey parties.....	289 85
	1499 & 1500	"	"	1,544 22
	1501–1508	"	"	6,683 52
	1516	"	"	76 02
	1517	"	"	1,138 02
	3 B.	Transfer.....	"	1,229 20
	15 A.	"	Supplies.....	14 24
Aug. 31..	23402	Hudson's Bay Co.....	Stationery.....	2 95
	23403	"	Cartage.....	31 88
	23404	"	Sundries.....	6 50
	23405	"	Rent, &c	5 00
			"	.....
			Carried forward	.....

GRAND TRUNK RAILWAY SYSTEM—*Continued.*

STATEMENT of amounts expended on surveys, &c.—*Continued.*

Date.	No.	Name.	For	Amount.
1904.				$ cts.
			Brought forward.	
	23406	Hudson's Bay Co.	Sundries	3 35
	23407	"	Freight charges.	3 29
	23408	Kelliher, B. B.	Disbursements.	66 15
	23411	Masters, John.	Repairing canoe.	8 00
	23413	Strong, W.	Dog feed.	24 95
	23663	Hudson's Bay Co.	Transportation	10 75
	23664	"	Sundries	3 50
	23842	Austin, J. McN.	Transportation	2,364 80
	23948	Hudson's Bay Co	Rental of canoes.	31 50
	23949	"	Freighting canoe	15 00
	23954	Agent, North Bay	Freight charges.	12 33
	24082	Gailor, C. F.	Expenses	39 05
	24083	"	Disbursements	42 65
	24093	McLean, W. J.	"	24 83
	24216	Hudson's Bay Co.	Freighting supplies.	376 35
	24462	Ahlstrom, N. E.	Care of dogs	5 40
	24465	Austin, J. McN.	Prepaid freight on supplies.	19 75
	24469	Bourke, Jno	Propor'n of electric light, North Bay office	2 85
	24475	Coldwell, R. W.	Sundries	95 05
	24485	Gzowski, C. S	Disbursements	41 82
	24490	McCool, P.	Proportion of rent, North Bay office.	23 80
	24491	Macrone, Grieve.	Disbursements	85 81
	24492	McDonald, D.	Transporting supplies.	499 38
	24493	McDougall, W. H . . .	"	1,485 00
	24498	Agent, North Bay. . . .	Freight charges.	6 98
	25622	Kelliher, B. B.	Disbursements	13 08
	25627	Ord, L. R.	"	29 44
	25630	Strong, W.	Feed for dogs.	26 15
	25631	Ward, E.	Proportion of rent, Winnipeg office.	12 86
	26005	Nelson, J. D.	Disbursements.	128 65
	26257	Hudson's Bay Co	Sundries	12 50
	24042	Stephens, J. R.	Proportion of salary.	187 50
	24043	Knowlton, G. A.	"	238 08
	24045	Hannington, C. F.	Salary	250 00
	24046	Kelliher, B. B.	Proportion of salary.	35 70
	32	Pay roll.	Proportion of salary office staff.	106 50
	1536	"	Survey parties	285 00
	1539-1545	"	"	6,935 26
Aug. 31 . .	1546	Pay roll.	Survey parties.	101 08
	1547	"	"	1,185 80
	3B.	Transfer	Supplies.	2,113 43
	15A.	"	Stationery	58 71
. . . . .		Thunder Bay Branch. . . .	Supplies transferred from.	151 53
. . . . .		" "	Snow shoes	30 00
Sept. 30 . .	26894	Austin, J. McN	Freight charges.	10 58
	26895	"	Freighting.	2,329 40
	26898	Hannington, C. F. . . .	Disbursements	128 90
	26899	Hudson's Bay Co	Sundries.	13 50
	26901	"	Freighting	198 30
	26902	Knowlton, G. A	Proportion of expenses.	57 85
	26903	"	Disbursements	84 44
	26904	Miller, J	Sundries	20 75
	26905	Agent, North Bay . . .	Freight charges.	8 03
	26951	Hudson's Bay Co	Freighting.	1,291 92
	27093	MacFarlane, P. B.	Expenses.	19 90
	27328	McDougall, W. H.	Freighting	2,309 40
	27329	"	Board	9 00
	27400	Silvester, G. E.	Expenses.	51 70
	27401	Ward, E	Proportion of rent, Winnipeg office.	12 86
	27714	Bourke, Jno	Proportion of electric light, North Bay office	2 85
	27715	Coldwell, R. W.	Disbursements.	22 96
	27716	T. Eaton Co	Furniture.	31 39
	27717	Gzowski, C. S	Disbursements.	55 23
			Carried forward	

GRAND TRUNK RAILWAY SYSTEM—*Continued.*

STATEMENT of amounts expended on surveys, &c.—*Continued.*

Date.	No.	Name.	For	Amount.
				$ cts.
			Brought forward	
1904.				
	27719	McCool, P	Proportion of rent, North Bay office	23 80
	27721	Walbourn, W. H	Sundries	7 50
	28673	Hamilton, W. B	Disbursements	85 78
	28676	Kelliher, B. B	"	68 33
	28680	Ord, L. R	"	189 61
	28725	Hudson's Bay Co	Freight charges	73 51
	28888	Stephen's, J. R	Proportion of expenses	14 57
	29590	Hudson's Bay Co	Supplies	7 00
	29802	Hogan, W	Board	81 37
	29803	Macrone, G	Disbursements	65 60
	27188	Stephens, J. R	Proportion of salary	187 50
	27189	Knowlton, G. A	"	238 08
	27192	Hannington, C. F	Salary	250 00
	27193	Kelliher, B. B	Proportion of salary	35 70
	32	Pay roll	" office staff	106 50
	1531	"	Surveys	285 00
	1532	"	"	186 27
	1533 to 1541	"	"	7,070 34
	1544	"	"	156 90
	1545	"	"	1,135 21
	3B	Transfer	Supplies	4,198 77
	15A	"	Stationery	104 66
Oct. 31	30084	Hudson's Bay Co	Express charges	1 65
	30348	Knowlton, G. A	Disbursements	36 27
	30349	"	Proportion of expenses	92 77
	30731	McCool, P	" rent, North Bay office	23 60
	30424	Hudson's Bay Co	Freighting supplies	186 95
	30426	Poile, Mrs	Board	35 75
	30676	Hudson's Bay Co	Freight	6 75
	30675	"	Cartage	10 20
	30997	Austin, J. McN	Transporting supplies	2,681 00
	31001	Hudson's Bay Co	Meals	4 00
	31002	"	Prepaid freight	13 50
	31603	Hamilton, W. B	Proportion of expenses	59 60
	31608	Hudson's Bay Co	Lumber	306 25
	31686	Austin, J. McN	Transporting supplies	2,354 60
	31688	Macrone, G	Disbursements	40 90
	32730	Hudson's Bay Co	Rent, &c	11 25
Oct. 31	32731	Hudson's Bay Co	Caretaker	50 00
	32732	"	Transporting supplies	3,847 58
	32734	"	Supplies	15 71
	32735	"	"	39 93
	32736	"	"	174 16
	32738	Kelliher, B. B	Disbursements	11 91
	32741	N. Bay, L. H. & P. Co	Proportion of electric light	2 85
	32742	Ord, L. R	Disbursements	27 51
	32747	Ward, E	Proportion of rent, Winnipeg office	12 86
	32995	Coldwell, R. W	Disbursements	15 70
	33014	Hogan, W	Board	86 70
	33016	Hudson's Bay Co	Freight charges	13 38
	33017	"	"	36 91
	33157	"	Cartage	16 60
	33158	"	Freighting	127 68
	33160	"	Sundries	3 78
	33440	Dohl, P. J	Care of dogs	45 00
	33432	Coldwell, R. W	Disbursements	63 30
	33433	Hannington, C. F	"	134 95
	33435	Hudson's Bay Co	Freighting	90 00
	30638	Stephens, J. R	Proportion of salary	208 34
	30639	Knowlton, G. A	" "	238 08
	30624	Hannington, C. F	Salary	250 00
	30623	Kelliher, B. B	Proportion of salary	35 70
	32	Pay rolls	" " office staff	118 34
			Carried forward	

SESSICNAL PAPER No. 62c

GRAND TRUNK RAILWAY SYSTEM—*Continued.*

STATEMENT of amounts expended on surveys, &c.—*Continued.*

Date.	No.	Name.	For	Amount.
				$ cts.
			Brought forward.	. . . . .
1904.				
	59	Pay rolls	Supply agent.	91 10
	1508	"	Surveys.	275 93
	1511–1516	"	"	3,262 67
	1517	"	"	72 86
	1521	"	"	1,241 77
	3 B.	Transfer	Supplies	5,282 59
	. . . . .	Thunder Bay Branch . . .	Supplies transferred from	66 00
	. . . . .	" "	" "	40 00
Nov. 30. . .	33528	Knowlton, G. A	Disbursements	103 33
	33529	"	Proportion of expenses	13 26
	33870	McDougall, W. H	Transporting supplies	2,475 62
	33897	Hudson's Bay Co.	Freight charges	13 81
	33899	"	"	335 16
	33902	Agent, North Bay	"	2 45
	33903	" "	"	2 10
	33968	Fanning, Geo.	Taking in supplies	25 75
	33969	Hudson's Bay Co.	Wages, proportion of	170 25
	33970	"	Cartage	1 00
	34141	Browning, A. G.	Proportion of rent, North Bay	35 71
	34170	Hudson's Bay Co.	Repairs to snowshoes	106 50
	34393	Austin, J. McN.	Transporting supplies	2,093 27
	34689	Hamilton, W. B.	Expenses	155 00
	34717	Hudson's Bay Co.	Transporting supplies	60 00
	34718	"	Repairing snowshoes	4 00
	34720	Mitchell, C. A	Expenses	27 10
	35588	Heaman, J. A	Disbursements	275 33
	35592	Kelliher, B. B	"	4 23
	35593	Knowlton, G. A	"	75 79
	35594	"	Proportion of expenses	18 94
	35598	Ward, E	" rent, Winnipeg	12 86
	35788	Bell Telephone Co	" services "	8 57
	34127	Stephens, J. R.	" salary	197 36
	34128	Knowlton. G. A	" "	238 08
	34131	Hannington, C. F.	Salary	250 00
	34132	Kelliher, B. B.	Proportion of salary	35 70
	32	Pay roll	" office staff	116 85
	59	"	Supply agent	150 00
	1464 & 1465	"	Surveys	1,601 96
	1466	"	"	244 64
	1469	"	"	529 37
	1470	"	"	78 42
	1472	"	"	922 12
	3 B.	Transfer	Supplies	4,030 62
	15 A.	"	Stationery (Oct)	81 08
	"	"	" (Nov.)	15 69
				310,923 16

1903.	*Less credits :—*	
April	Refund of railway fare	$ 3 00
July	" C. N. Ry. fare and pullman	12 80
August. . .	Deduction on pay rolls for supplies	32 00
September. .	" " "	53 70
October.	" " "	110 00
"	Pay draft cancelled	15 48
November. .	Supplies returned to Hudson's Bay Co	114 78
December . .	Deduction on pay rolls for supplies	39 50
1904.		
January . . .	" " "	22 58
	Draft cancelled	50 00

Carried forward. . . . . .

GRAND TRUNK RAILWAY SYSTEM—*Continued.*

STATEMENT of amounts expended on surveys, &c.—*Continued.*

1904.	*Less credits*—Con.	$ cts.	$ cts.
	Brought forward		
February	Paid in by J. R. Stephens, account supplies	10 00	
March	Deduction from pay rolls for supplies	38 25	
	Draft cancelled	9 03	
May	Wages transferred to Thunder Bay Branch	264 57	
	Deductions from pay rolls for supplies	5 61	
June	Wages transferred to Thunder Bay Branch	22 35	
	Rebate on supplies	22 00	
August	Deductions from pay rolls, account supplies	22 76	
	Correction of transfer of supplies from Thunder Bay Branch	151 53	
September	Pay drafts cancelled	106 94	
	Deductions on pay rolls for supplies	91 50	
October	Pay draft cancelled	45 00	
	Deductions on pay rolls for supplies	75 88	
	Refund, J. McN. Austin	2 41	
November	Paid in by J. R. Stephens, account supplies	9 79	
			1,331 46
			309,591 70

STATEMENT showing interest due to November 30, 1904, on amounts advanced for surveys of Transcontinental Railway east of Winnipeg.

Month Advance made.	Amount.	Interest.		
		No. of Months.	Rate.	Amount.
1903.	$ cts.			$ cts.
February	138 09	21	4	9 67
March	730 16	20	"	48 68
April	3,171 09	19	"	200 83
May	4,027 27	18	"	241 64
June	15,711 99	17	"	890 35
July	12,677 02	16	"	676 11
August	19,525 58	15	"	976 28
September	17,873 90	14	"	834 11
October	17,929 03	13	"	776 92
November	11,422 84	12	"	456 91
December	16,219 79	11	"	594 73
1904.				
January	12,560 22	10	"	418 67
February	13,248 90	9	"	397 47
March	16,906 15	8	"	450 83
April	19,538 00	7	"	455 89
May	22,824 85	6	"	456 50
June	16,014 50	5	"	266 91
July	15,533 83	4	"	207 12
August	17,239 94	3	"	172 40
September	21,252 96	2	"	141 69
October	21,865 13	1	"	72 88
November	14,511 92			
	310,923 16			8,746 59

SESSICNAL PAPER No. 62c

GRAND TRUNK RAILWAY SYSTEM—*Continued.*

INTEREST on Credits to Advances made to November 30, 1904, for surveys of the Transcontinental Railway east of Winnipeg.

Month.	Amount.	INTEREST.		
		No. of Months.	Rate.	Amount.
	$ cts.			$ cts.
1903.				
April	3 00	19	4	0 19
July	12 80	16	"	0 68
August	32 00	15	"	1 60
September	53 70	14	"	2 51
October	125 48	13	"	5 44
November	114 78	12	"	4 59
December	39 50	11	"	1 45
1904.				
January	72 58	10	"	2 42
February	10 00	9	"	0 30
March	47 28	8	"	1 26
May	270 18	6	"	5 40
June	44 35	5	"	0 74
August	174 29	3	"	1 74
September	198 44	2	"	1 32
October	123 29	1	"	0 41
November	9 79			
	1,331 46			30 05

'A.'

THE COMMISSIONERS OF THE TRANSCONTINENTAL RAILWAY, OTTAWA

TO

GRAND TRUNK RAILWAY SYSTEM. DR.

1904.

December 31, for amount expended on surveys on main line of the Transcontinental Railway, east of Winnipeg, including the whole of party No. 3, to November 30, 1904, as per detailed statement attached.. .. .. $309,591 70

Interest on above to November 30, 1904, per statement attached.. .. .. $8,746 59

Less—

Interest on credits to November 30, 1904, per statement attached.. .. .. 30 05 8,716 54

$318,308 24

KENT & TURCOTTE,
WM. AINSLIE,
G. A. BELL.

'B.'

LIST.

Amount expended on surveys with interest to November 30, 1904, as per statement 'A'.		$318,308 24
Total cost of party No. 3.	$44,067 44	
Less cost of buildings, equipment and outfit taken by the Commission.	$ 9,485 38	
One-fifth of balance assumed by the Commission. .	6,916 41	
	$16,401 79	
Less interest charged on four-fifths of above. . . .	778 92	15,622 87
		28,444 57
Amount due to Grand Trunk Pacific Railway Company.		$289,863 67

KENT & TURCOTTE,
WM. AINSLIE,
G. A. BELL.

'C.'

RECAPITULATION showing engineering equipment, camp equipment, stationery, kitchen equipment and supplies on hand November 30, 1904, with the various parties or stored at caches, warehouses or storehouses and at division and district engineers' offices; cost of transporting same from railroad, freight charges, and also value of all caches and other buildings.

Engineering equipment—			
List 'C'.	$ 2,023 25		
'E'.	182 00		
'G'.	1,286 00		
'M'.	445 34		
		$ 3,936 59	
Camp equipment—			
List 'C'.	$ 4,918 52		
'E'.	483 70		
'G'.	1,337 06		
'H'.	137 58		
'M'.	728 90		
		7,605 76	
Stationery list—			
List 'C'.	$ 100 00		
'G'.	100 00		
		200 00	
Kitchen equipment—			
List 'C'.	$ 200 00		
'G'.	50 00		
'H'.	21 90		
'M'.	25 73		
		297 63	

'C'—*Concluded.*

Supplies—			
List 'C'	$ 17,401 51		
'F'	72 66		
'H'	1,539 66		
'M'	2,242 70		
		$ 21,256 63	
Transportation from railroad—			
List 'C'	$ 26,517 24		
'G'	45 00		
'H'	2,019 80		
'M'	5,219 84		
		33,801 88	
Freight on railroad—			
List 'C'	$ 759 79		
'F'	7 80		
'G'	0 90		
'H'	60 59		
'M'	97 87		
		926 95	
Warehouses, cachés and other buildings—			
List 'C'	$ 4,910 00		
'H'	300 00		
'M'	725 00		
		5,935 00	
		$ 73,960 34	

KENT & TURCOTTE,
WM. AINSLIE,
G. A. BELL.

'CC.'

STATEMENT showing supplies on hand December 1, 1904, and cost of same at cachés Nos. 8*a*, 9, 9*a*, 10, 10*a*, 11, foot of Long Lake; 11*a*, 12, 13, Ombabika warehouse; old caché 13 at Ombabika; Wabinosh warehouse, Montizambert warehouse, 14, 15, 16, 18, 19, 20, 21, and with field parties, 4, 5, 6 and 7. Also cost of transporting supplies to above cachés and warehouses, and value of cachés and warehouses.

Supplies.

Flour	lbs.	68,210	$ 1,807 57
Cornmeal	"	5,245	89 17
Rolled oats	"	5,294	158 82
Granulated sugar	"	17,330	875 17
Table salt	"	2,963	23 70
Baking powder	"	1,292	142 12
Ground ginger	"	89½	24 92
Ground mustard	"	90	36 00
Ground cinnamon	"	57	15 96
Ground allspice	"	56	15 68
Ground nutmeg	"	57	48 45
Ground black pepper	"	98	29 40
S. C. pork	"	13,836	1,604 98
L. C. bacon	"	11,063	973 54

'CC'—*Continued.*

Supplies—Continued.

Canned corn beef	lbs.	16,781	$ 1,594 20
Condensed milk	cases	272	1,305 60
Coffee	lbs.	1,010	252 50
Tea	"	1.894	435 62
Lard	"	4,931	608 16
Yeast cakes, at $1.10	cases	64	70 40
Cheese	lbs	2,340	304 20
Beans	"	15,238	457 14
Split pease	"	3,865	106 29
Rice	"	3.363	134 52
Corn starch	"	500	31 25
Macaroni	"	977	63 51
Pearl barley	"	416	15 22
Soap	"	2,203	137 69
Lemon extract	"	54	45 90
Vanilla extract	"	36	30 60
Currants	"	360	21 60
Raisins	"	2,690	215 20
Evaporated apples	"	3.825	277 32
Evaporated peaches	"	3.200	320 00
Prunes	"	3,035	242 80
Pickles in 5 gal. kegs	kegs	89	222 50
Vinegar	gals.	55	33 00
Pilot bread	cases.	243	332 91
Matches	gross.	93	41 85
Candles, 3-doz. box	boxes.	91	491 40
Butter	lbs.	6.574	2,235 16
Evaporated potatoes	"	7,858	569 71
Evaporated onions	"	426	127 80
Cartridges, 38-55		1.740	63 51
Cartridges, 16-8		1,117	25 13
Cartridges, 16-4		1.775	40 00
Corn meal, dog feed	lbs.	9.620	177 97
Sago	"	10	1 00
Tallow, dog feed, 58 kegs	"	2.900	203 00
Codfish	"	108	6 48
Tapioca	"	50	5 00
Coarse salt	"	300	3 00
Lye	tins	29	2 50
Buckwheat	lbs.	433	10 83
Baking soda	pkgs.	18	1 26
Canned corn	cases	17	50 15
Syrup molasses	gals.	95	47 50
Tomatoes	cases	11	39 60
Molasses	gals.	85	42 20
Canned pears	cases	4	24 00
Canned peaches	"	11	75 35
Canned apples	"	3	12 00
Cocoa	box	1	1 50
Total			$17,401 51

'CC'—*Continued.*

Equipment on hand at caches and warehouses, December 1, 1904.

14	canoes at $37.50	$525 00
15	toboggans at $6	90 00
15	stoves at $2	30 00
16	paddles at $1.25	20 00
14	pack straps at $1.50	21 00
7	saws at $1.10	7 70
16	dogs at $10	160 00
16	sets harness at $2.80	44 80
36	cooking outfits at $3	108 00
612	lbs. tar paper	6 00
24	tents at $20	480 00
18	tent flies at $9	162 00
2	picks and handles at $1	2 00
142	axes at 60 cents	85 20
278	axe handles at 25 cents	69 50
5	grindstones at 30 cents	1 50
175	lbs. rope at 14 cents	24 50
16	shovels at 60 cents	9 60
118	lbs. nails at 5 cents	5 90
45	lbs. duck	7 20
34	fishing lines at 25 cents	8 50
23	gals. paint at 60 cents	13 80
12	pairs snowshoes at $4.50	54 00
11	guns, 16 ga., at $6.50	71 50
2	rifles, Winchester, 38.55, at $13.75	27 50
		$2,035 20

Engineering Equipment, &c., with Field Parties on Sections 4, 5, 6 and 7, December 1, 1904, and value of same.

5	Transits at $205	$1,025 00
4	Levels at $125	500 00
4	Steel tapes, 100 feet, at $11.25	45 00
5	Chains, 100 link, at $7.50	37 50
21	Chains, extra link	
5	Tapes, 50 feet, with cases, at $2.50	12 50
3	Tapes, 50 feet, without cases, at $1.25	3 75
6	Level rods at $9	54 00
8	Flag-poles at $2.25	18 00
6	Hand levels at $9	54 00
5	Barometers at $27	135 00
4	Pocket compasses at $15	60 00
4	Passometers at $7.50	30 00
65	Axes at 60c	39 00
26	Axe handles at 25c	6 50
5	Hand axes at 60c	3 00
	Stationery	100 00
4	Alarm clocks at 75c	3 00
4	Brush hooks at 60c	2 40

'CC'—*Continued.*

Engineering Equipment, &c.—Continued.

4	Dippers at 5c	$ 0 20
20	Dogs at $10	200 00
3	Files, flat, at 10c	0 30
1	File, 3-cornered	0 10
4	Grindstones at 75c	3 00
44	Sets harness at $2.80	123 20
3	Monkey wrenches at 30c	0 90
1	Mess chest	2 00
6	Lbs. nails at 5c	0 30
11	Yards oilcloth at 40c	4 40
65	Pack straps at $1.50	97 50
4	Padlocks at 25c	1 00
16	Stoves (Queen Heaters) at $3.50	56 00
96	Stove pipes at 7c	6 72
4	Stove pipes, with dampers, at 15c	0 60
2	Shovels at 60c	1 20
1	Spade	0 75
3	Hand-saws at $1.10	3 30
4	Cross-cut saws at $1.50	6 00
1	Screwdriver	0 20
89	Pairs snowshoes at $4.50	400 50
23	Tents at $20	460 00
5	Tent flies at $9	45 00
6	Tables at $1.50	9 00
26	Toboggans at $6	156 00
32	Toboggan covers at $6	192 00
1	Washtub	0 60
1	Washboard	0 10
9	Wash basins at 10c	0 90
4	Water pails at 25c	1 00
25	Canoes at $37.50	937 50
50	Paddles at $1.25	62 50
5	Paint brushes at 20c	1 00
4	Medicine chests at 75c	3 00
1	Sounding rod at $1.70	1 70
	Kitchen equipment	200 00
615	Rounds cartridges at 3c	18 45
4	Shotguns at $6.50	26 00
4	Rifles (Winchester) at $13.75	55 00
		$5,206 57
	Cost of transporting above equipment	640 00
		$5,846 57

'CC'—*Concluded.*

Summary.

Supplies	$17,401 51
Cost of transporting same from railroad to various cachés, 253,263 lbs	25,877 24
Freight on above at 30c. per cwt	759 79
Equipment on hand at caché and storehouses	2,035 20
Value of cachés and warehouses	4,910 00
Value of engineering equipment, camp equipment and stationery	5,206 57
Cost of transporting above equipment	640 00
	$56,830 31

KENT & TURCOTTE,
WM. AINSLIE.
G. A. BELL.

'D.'

STATEMENT showing principal Articles of Engineering and Camp Equipment purchased by Grand Trunk Pacific Railway in connection with their surveys of the main line east of Winnipeg; also quantity on hand November 30, 1904 (as per their inventory.)

Article.	No. Purchased.	No. on Hand.	No. Short.	Remarks.
Canoes, all kinds	99	54	45	Mr. Knowlton reports canoes pretty well worn.
Sleighs and toboggans	116	51	65	Used up.
Toboggan covers	70	57	13	"
Snowshoes	364	179	185	"
Blankets, prs	300	86	214	Sold and used up.
" (rabbit skin)	12	—	12	Sold.
" (rubber)	3	-	3	Used up.
Rifles	9	8	1	Lost in upset.
Shot guns	13	7	6	Missing.
Stoves, cook and camp heaters	127	51	76	Used up.
Dogs	160	49	111	A great many dogs turned loose in spring to save expense of keeping.
Tarpaulins	15	1	14	Used up.
Rope ladder	1		1	Missing.
Tents	117	63	54	Used up.
Transits	9	9		
Levels	8	8	—	
Hand levels	15	12	3	Lost.
Barometers	9	8	1	"
Gurley rods	11	11		
Chains	8	8		
Passometers	5	5		
Binocular	1	—	1	Lost in upset.

KENT & TURCOTTE,
WM. AINSLIE,
G. A. BELL.

'E.'

STATEMENT showing equipment on hand in Division Engineer's Office, North Bay, and District Engineer's Office, Nipigon, and value of same.

Blankets, pairs, 16 at $3	$ 48 00
Blankets, single, 9 at $1.50	13 50
Steel range poles, 16 at $2	32 00
Level rods, 15 at $9	135 00
Metallic tapes, 3 at $2.50	7 50
Steel tapes, 3 at $2.50	7 50
Toboggan covers, 20 at $6	120 00
Canoes, 1 at $30	30 00
Toboggans, 3 at $6	18 00
Stoves, 1	3 00
Paddles, 19 at $1.25	23 75
Pack straps, 4 at $1.50	6 00
Saws, 1	1 10
Dogs, 9 at $10	90 00
Dog harness, sets, 5 at $2.80	14 00
Cooking outfits for 6 men at $3	18 00
Tents, 3 at $20	60 00
Axes, 6 at 60 cents	3 60
Shovels, 1	0 75
Fishing lines 2 at 25 cents	0 50
Snowshoes, pairs, 6 at $4.50	27 00
Shotguns, 16 ga., 1	6 50
	$665 70

KENT & TURCOTTE,
WM. AINSLIE,
G. A. BELL.

'F.'

STATEMENT showing Dog Feed on hand at various points, outside cachés.

—	Tallow.	Cornmeal.	Rolled oats.
	Lbs.	Lbs.	Lbs.
Division Engineer's office, North Bay		300	480
" " Nipigon	200	160	200
Hudson Bay Co., Biscotasing		100	80
Warehouse, Ridout		100	80
Hudson Bay Co., Missanabie		100	80
C. P. R. Station, Grassett		100	80
" Jackfish		100	80
Warehouse, Asaquan		100	80
Hudson Bay Co., Dinorwic		100	80
	200	1,160	1,240

200 lbs. tallow at 75 cts	$	14 00
1,160 " cornmeal at $1.95		21 46
1,240 " rolled oats at $3		37 20
2,600 lbs	$	72 66
Freight on 2,600 lbs at 30 cts		7 80
	$	80 46

KENT & TURCOTTE,
WM. AINSLIE,
G. A. BELL,

SESSICNAL PAPER No. 62c

'G.'

STATEMENT showing engineering equipment, stationery, camp equipment, kitchen equipment, and firearms on hand, with field parties on sections 8 and 9, and value of same.

Engineering Equipment—	
Transits, 2 at $205	$ 410 00
Levels, 2 at $125	250 00
Chains, 2 at $7.50	15 00
Tapes, 50 ft. in cases, 4 at $2.50	10 00
Tapes, 50 ft. without cases, 2 at $1.25	2 50
Level rods, 4 at $9	36 00
Flag poles, 4 at $2.25	9 00
Hand levels, 5 at $9	45 00
Barometers, 2 at $27	54 00
Pocket compasses, prismatic, 6 at $15	90 00
Axes, 25 at 60 cents	15 00
Axe handles, 30 at 25 cents	7 50
Hand axes, 9 at 60 cents	5 40
Hand axe handles, 24 at 25 cents	6 00
Sledge, 1 at	0 60
Stationery	100 00
Camp Equipment—	
Pack straps, 16 at $1.50	24 00
Alarm clocks, 2 at 75 cents	1 50
Dippers, 2 at 10 cents	0 20
Flat files, 4 at 10 cents	0 40
Grindstones, 2 at 75 cents	1 50
Blankets, 63 pairs at $3	189 00
Dog harness, 34 sets at $2.80	95 20
Dog chains, halters, 1	0 50
Hatchets, 1	0 50
Lamps, 1	0 25
Tump lines, 16 at $1.50	24 00
Dogs, 24 at $10	240 00
Oilcloth, 6½ yards at 50 cents	3 25
Stoves, 3 at $3	9 00
Stoves, heating, 4 at $3.50	14 00
Stoves, cook, 2 at $18	36 00
Stovepipe lengths, 54 at 7 cents	3 78
Stovepipes with dampers, 6 at 15 cents	0 90
Hand-saws, 1	1 10
Cross-cut saws, 1	1 50
Screwdrivers, 2 at 20 cents	0 40
Tents, 12 x 14, 10 oz., 2 at $20	40 00
Tents, 12 x 14, 12 oz., 4 at $20	80 00
Tents, 14 x 16, 2 at $20	40 00
Tents, Tripping, 8 x 10, 1	15 00
Tents, Dining S. Patent, 1	30 00
Tents, flies, 2 at $9	18 00
Wash tubs, 1	0 60
Wash boards, 2 at 10 cents	0 20
Wash basins, 2 at 10 cents	0 20
Water pails, 2 at 50 cents	1 00
Canoes (Peterboro) 5 at $37.50	187 50
Snowshoes, 50 at $4.50	225 00

'G'—*Continued.*

Kitchen Equipment—	
Kitchen equipment	$ 50 00
Firearms—	
Cartridges, rounds, 300, at $3.65	10 95
Shotguns, D.B., 1, $6.50	6 50
Rifles (Winchester), 2 at $13.75	27 50
Cartridges, rounds, 50 at $2.25	1 13
At Assistant Chief Engineer's Office in Montreal—	
Transit, 1	205 00
Level, 1	125 00
	$2,773 06
Transportation from railroad on above, 300 lbs. at 15c. per lb	45 00
Freight on above at 30c. per 100	0 90
	$2,818 96

KENT & TURCOTTE.
WM. AINSLIE.
G. A. BELL.

STATEMENT showing Supplies and Equipment on hand at White Dog and Eagle River cachés, and value of same; also value of buildings.

Supplies—	
Flour, 3,000 lbs. at $2.65	$ 79 50
Buckwheat flour, 200 lbs. at $2.50	5 00
English breakfast bacon, 920 lbs. at 8⅘c	80 96
D. S. bacon, 400 lbs. at 8⅘c	35 20
Hams, 790 lbs. at 16c	126 40
Corned beef, 250 lbs. at $9.50	23 75
Brawn beef, 250 lbs. at $3.50	8 75
Roast beef, 200 lbs. at 20c	40 00
Rolled oats, 360 lbs. at $3	10 80
Gran. sugar, 800 lbs. at $5.05	40 40
Brown sugar, 450 lbs. at $4	18 00
Rice, 500 lbs. at $4	20 00
Tea, 117 lbs. at 22c	25 74
Coffee, 95 lbs. at 25c	23 75
Cream, cases, 3 at $4.80	14 40
Beans, 650 lbs. at $3	19 50
Butter, 400 lbs. at 34	136 00
Baking powder, 90 lbs. at 11c	9 90
Yeast cakes, boxes, 4 at $1.10	4 40
Evap. apples, 700 lbs. at $7.25	50 75
Evap. peaches, 550 lbs. at 10c	55 00
Prunes, 400 lbs. at 8c	32 00
Lard, 315 lbs. at 12⅓	38 85
Cheese, 80 lbs. at 13c	10 40
Soap, 110 lbs. at $3.75 per 60 lbs	6 88
Macaroni, 95 lbs. at 6½c	6 17

SESSICNAL PAPER No. 62c

STATEMENT showing Supplies and Equipment, at White Dog, &c.,—*Continued.*

Supplies—Continued.

Salt, 150 lbs. at 8-10c.	$ 1 20
Matches, gross, 6½ at 45c.	2 93
Jam, 84 lbs. at 20c.	16 80
Marmalade, 49 lbs. at 20c.	9 80
Pepper, 5½ lbs. at 30c.	1 65
Ginger, 5½ lbs. at 28c.	1 54
Ground nutmegs, 1½ lbs. at 85c.	1 28
Tomatoes, cases, 6 at $2.88.	17 28
Corn, cases, 2 at $2.88.	5 76
Raisins, 150 lbs. at $8.	12 00
Dessicated potatoes, 700 lbs. at 15c.	105 00
Dessicated onions, 450 lbs. at 30c.	135 00
Candles, 160 lbs. at 13½c.	21 60
Barley, 50 lbs. at 3¾c.	1 88
Cornmeal, sacks, 2,000 at $1.85.	37 00
Pilot bread, cases, 6 at $1.37.	8 22
Currants, 60 lbs. at 6c.	3 60
Extract lemon (bottles) 9 at 85c.	7 65
Extract vanilla (bottles) 10 at 85c.	8 50
Split peas, 200 lbs. at $2.75.	5 50
Vinegar, 2 gals. at 60c.	1 20
Molasses, 30 gals. at 50c.	15 00
Tallow, 1,700 lbs. at 7c.	119 00
Cond. milk, cases, 9 at $4.80.	43 20
L. C. bacon, 200 lbs. at 8⅘c.	17 60
Pumpkins, cases, 2 at $2.88.	5 76
Baking soda, 12 lbs. at 7c.	0 84
Tapioca, 40 lbs. at 10c.	4 00
Seamless sacks, 4 doz. at $1.20.	4 80
Cornstarch, 25 lbs. at 6¼c.	1 57

Equipment—

Axes, 1.	0 60
Axe handles, 6 at 25c.	1 50
Hand axes, 1.	0 60
Hand axe handles, 2 at 25c.	0 50
Inkstands, 1	0 25
Padlocks, 1.	0 25
Rope, 120 yds. at 14c.	16 80
Rope, 36 yds. at 14c.	5 04
Small tin stoves, 2 at $2.50.	5 00
Stovepipe lengths, 17 at 7c.	1 19
Saw handles, 1.	1 10
Cross-cut saws, 2 at $1.50.	3 00
Bucksaws, 1.	0 50
Blankets, prs, in use, 3 at $3.	9 00
Tarpaulins, 1.	6 00
Scales, 30 lbs., 1.	15 00
Hammers, 1.	0 25
Hammers, claw, 1.	0 25
Canoes, (Peterboro, 16 ft.), 1.	25 00
Canoes (Peterboro) 18 ft., 2 at $15.	30 00
Brooms, 1.	0 25
Cooking range, 1.	18 00

STATEMENT showing Supplies and Equipment at White Dog, &c.—*Concluded.*

Equipment—Continued.

Cups, 1	$ 0 05
Mugs, 1	0 05
Table forks, 2 at 5c	0 10
Butcher knives, 1	0 25
Table knives, 2 at 5c	0 10
Cast iron pots, 16-inch, 1	0 60
Can openers, 1	0 10
Plates, 2 at 5c	0 10
Medium pans, 2 at 20c	0 40
Pans, dish, 4 qt., 1	0 15
Pans, dish, 6 qt., 1	0 20
Pans, enamelled, medium, 1	0 25
Teaspoons, 3 at 5c	0 15
Tablespoons, 3 at 5c	0 15
Granite teapot, 1	0 50
Granite coffeepot, 1	0 50
Rifles, Winchester, 1	13 75
Grindstone, 1	0 75
Lamp chimneys, 7	0 35
Nails, 4 lbs.	0 20
Wash basins, 1	0 20
Water pails, 2	0 50
	$1,699 14
Transportation from railway on above, 20,198 lbs. at 10	2,019 80
Freight charges at 30c. per cwt.	60 59
Value of buildings	300 00
	$4,079 53

KENT & TURCOTTE,
WM. AINSLIE.
G. A. BELL.

'K.'

STATEMENT showing basis upon which Assistant Chief Engineer and Division Engineers' salaries were prorated.

J. R. Stephens, Assistant Chief Engineer.

February 19, 1903, to September 1, 1903—
6 Transcontinental parties.
2 Grand Trunk Pacific parties.
September 1, 1903, to December 1, 1903—
7 Transcontinental parties.
9 Grand Trunk Pacific parties.
December 1, 1903, to February 1, 1904—
7 Transcontinental parties.
11 Grand Trunk Pacific parties.

'K'—*Continued.*

February 1, 1904, to May 1, 1904—
7 Transcontinental parties.
13 Grand Trunk Pacific parties.
May 1, 1904, to October 1, 1904—
6 Transcontinental parties.
14 Grand Trunk Pacific parties.
October 1, 1904, to November 1, 1904—
6 Transcontinental parties.
12 Grand Trunk Pacific parties.
November 1, 1904, to November 30, 1904—
6 Transcontinental parties.
13 Grand Trunk Pacific parties.

Geo. A. Knowlton, Division Engineer.
April 20, 1903, to January 1, 1904—
3 Transcontinental parties.
2 North Bay parties.
January 1, 1904, to November 30, 1904—
5 Transcontinental parties.
2 North Bay parties.

Geo. A. Kyle, Division Engineer,

B. B. Kelliher, successor, June 1st, 1904—
April 3, 1903, to September 1, 1903—
4 Transcontinental parties.
September 1, 1903, to October 1, 1903—
4 Transcontinental parties.
1 Thunder Bay party.
October 1, 1903, to December 1, 1903—
2 Transcontinental parties.
1 Thunder Bay party.
2 Grand Trunk Pacific parties.
December 1, 1903, to January 1, 1904—
4 Transcontinental parties.
1 Thunder Bay party.
3 Grand Trunk Pacific parties.
January 1, 1904, to May 1, 1904—
2 Transcontinental parties.
2 Thunder Bay parties.
3 Grand Trunk Pacific parties.
May 1, 1904, to November 30, 1904—
1 Transcontinental party.
3 Thunder Bay parties.
3 Grand Trunk Pacific parties.

KENT & TURCOTTE,
WM. AINSLIE,
G. A. BELL.

"L"

STATEMENT showing District and Assistant Engineers employed on the Main Line East of Winnipeg.

TRANSCONTINENTAL RAILWAY.

Assistant Engineer.	Date of Appointment.	Left Service.
PARTY NO. 3.		
McLellan, Alex.	March 13, 1903.	May 9, 1904.
Usborne, Wm.	May 9, 1904.	July 31, 1904.
Mitchell, C. A.	July 6, 1904.	
PARTY NO. 4.		
Hill, C. C	March 25, 1903.	October 4, 1903.
Boucher, C. R.	October 1, 1903	December 31, 1903.
Nelson, J. D.	January 1, 1904.	May 31, 1904.
Coldwell, R. W.	June 8, 1904.	
PARTY NO. 5.		
McCarthy, Wm	May 26, 1903.	January 8, 1904.
Balloch, G. R	January 1, 1904.	June 1, 1904.
Gzowski, C. S.	June 2, 1904.	September 30, 1904.
Proctor, A. F	October 5, 1904.	
PARTY NO. 6.		
Nutting, M. E.	May 11, 1903	April 10, 1904.
Tempest, J. S.	April 1, 1904	
PARTY NO. 7.		
Mayer, Wm	May 1, 1903.	September 30, 1903.
Pim, J. P.	September 6, 1903.	June 24, 1904.
Gailor, C. F	May 12, 1904.	July 31, 1904.
Macrone, G	August 1, 1904.	
PARTY NO. 8.		
Rice, G. M.	May 1, 1903.	July 6, 1903.
Ord, L. R.	July 1, 1903.	

'L'—*Continued.*

PARTY NO. 9.

Allan, A. G	June 6, 1903	November 22, 1903.
Heaman, J. A	November 23, 1903	
District Engineer.		
Hannington, C. F	January 1, 1904	January 31, 1905.

THUNDER BAY—PARTY NO. 2.

Mitchell, W. H., revising parties 7 and 8	January 1, 1904	March 31, 1904.
Griffith, C. L.	July 10, 1903	February 28, 1904.
Mann, Wm	October, 1903	December, 1903.

Kyle, G. A., Winnipeg, succeeded by D. B. Kelliher, June 1, 1904, District Engineer in charge of parties 8 and 9.

Knowlton, G. A., North Bay, District Engineer, in charge of parties 3, 4, 5, 6 and 7.

KENT & TURCOTTE,
WM. AINSLIE,
G. A. BELL.

"M."

STATEMENT showing Total Cost of Party No. 3, to November 30, 1904. Also Amount chargeable to Transcontinental Commission should the commissioners take over only one-fifth (Western End) including all supplies, engineering equipment, cachés and warehouses on that section.

SUPPLIES ON HAND.

Article.	Quantity.		Value.	Total Value.
			$ cts.	$ cts.
Flour	7,850		2 65	208 02
Cornmeal	850		1 70	14 45
Rolled oats	816		3 00	24 48
Gran. sugar	2,550		5 05	128 78
Table salt	340		0 08 1/5	2 72
Baking powder	170		0 11	18 70
Ground ginger	17		0 28	4 76
Ground mustard	17		0 40	6 80
Ground cinnamon	8 1/5		0 28	2 38
Ground allspice	8 1/5		0 28	2 38
Nutmegs	8 1/2		0 85	7 23
Black pepper	17		0 30	5 10
S. C. pork	1,700		11 60	197 20
L. C. bacon	2,040		0 08 4/5	179 52
Canned corn beef	1,428		9 50	135 66
Condensed milk	34		4 80	163 20
Coffee	85		0 25	21 25
Tea	255		0 22	58 65
Lard	510		0 12 1/3	62 90
Yeast cakes	8 1/2	Cases	1 10	9 35
Cheese	340		0 13	44 20
Beans	2,550		3 00	76 50
Split peas	850		2 75	23 38
Rice	425		0 04	17 00
Macaroni	68		0 06 1/2	4 42
Pearl barley	68		0 03 3/4	2 55
Cornstarch	85		0 06 1/4	5 32
Soap, per 60 lbs	255		3 75	15 94
Lemon extract	8 1/5	pints.	0 85	7 23
Vanilla extract	8 1/2		0 85	7 23
Currants	85		6 00	5 10
Raisins	425		8 00	34 00
Evap. apples	425		7 25	30 82
Evap. peaches	425		0 10	42 50
Prunes	425		8 10	34 00
Pickles, in 5 galls	8 1/5		2 50	21 25
Vinegar	8 1/2	galls.	0 60	5 10
Pilot bread	17	cases.		23 37
Matches	8 1/2	gross.	0 45	3 82
Candles	680		0 13 1/2	91 80
Butter	850		0 34	289 00
Evap. potatoes	850		0 15	127 50
Onions (evap.)	85		0 30	25 50
Cartridges (Winchester)	415	r'nds.	3 65	15 15
" (shot—16-8,	210	"	2 25	4 72
" (shot—16-4) for 75	425	"	1 69	
				9 57
Corn meal (dog feed)	1,200	lbs.	1 85	22 20
				2,242 70

'M'—*Continued.*

ENGINEERING AND CAMP EQUIPMENT.—(On hand)

1 transit	$ 205 00	1 sounding rod	$ 1 70
1 level	125 00	1 cooking range	18 00
1 steel tape, 100 ft	11 25	36 coffee cups at 95c. per doz	2 85
1 steel chain, 100 ft	7 50	21 forks at $1.20 per doz	2 10
1 50-ft. tape, in case	2 50	1 flour sieve	0 15
1 50-ft. tape, without case	1 25	2 bread knives at 30c	0 60
1 level rod	9 00	18 table knives at $1.20 per doz	1 80
2 flag poles at $2.25	4 50	10 kettles at 45c	4 50
1 hand level	9 00	2 cast iron kettles at $3	6 00
1 barometer	27 00	1 soup ladle	0 15
1 pocket compass (prismatic)	15 00	12 dish-up pans at 7c	0 84
1 pedometer	7 50	2 small fry pans at 25c	0 50
21 axes at 60c. each	12 60	29 granite plates at $1.20 per doz	2 90
1 drafting board and trestle	1 49	14 teaspoons at 55c. per doz	0 64
1 metal protractor	3 00	24 tablespoons at $1.10 per doz	2 20
1 steel straight-edge	3 75	1 steel	0 50
1 stationery chest	1 50	12 yds. duck at 10c	1 20
20 yds. tracing cloth at $4.70	9 40	1 shot gun	6 50
2 alarm clocks at 75c	1 50	1 Winchester rifle	13 75
1 brush hook	0 60	1 canoe	30 00
8 dogs at $10	80 00	1 toboggan	6 00
1 grindstone	0 75	1 stove	2 00
8 sets dog harness at $2.80	22 40	2 pack straps at $1.50	3 00
12 pack straps at $1.50	18 00	2 cooking outfits at $1.50	3 00
1 padlock	0 25	1 tent, 12 x 14	20 00
4 Queen heaters at $3.50	14 00	8 axes at 60c	4 80
25 lengths stove pipe at 7c	1 75	10 axe handles at 25c	2 50
1 spade	0 75	2 fish lines	0 10
1 hand-saw	1 10	2 pairs snowshoes	9 00
1 crosscut-saw	1 50	1 shot gun, 16 ga	6 50
5 screwdrivers at 20c	1 00	1 building, cache No. 6a	150 00
20 pairs snowshoes at $1.50	90 00	2 buildings, caché 7	225 00
4 tents at $20	80 00	1 " " 7a	150 00
1 fly,	9 00	2 " " 8	200 00
6 toboggans at $6	36 00	Transportation on supplies in above cachés, 32,624 lbs. at 16c	5,219 84
5 toboggan covers at $6	30 00	Freight on above at 30c. per cwt.	97 87
5 canoes at $37.50	187 50		
1 wash tub	0 60		
10 paddles at $1.25	12 50		
1 medicine chest	0 75		$ 7,242 68

Cost of Party No. 3		$ 41,984 86	
Add proportion of North Bay office		1,450 48	
Add proportion of Montreal office		632 10	
			$ 44,067 44
Deduct:		44,067 44	
Supplies in cachés	$ 2,242 70		
C.P.R. freight charges	97 87		
Transporting supplies	5,219 84		
Buildings and equipment	1,924 97		
		$ 9,485 38	
		$ 34,582 06	
½ Transcontinental		6,916 41	
		$ 27,665 65	
Add interest on expenditure		778 92	
			28,444 57
Amount due Grand Trunk Railway by Commissioners of the Transcontinental Railway			$ 15,622 87

Detail of Cost of Party No. 3 to Nov. 30, 1904:—

Wages	$ 20,058 37
Supplies	18,873 51
Equipment	1,768 40
Incidentals	1,284 58
Proportion, North Bay office	1,450 48
Proportion, Montreal office	632 10
	$ 44,067 44

KENT & TURCOTTE,
WM. ANISLIE,
G. A. BELL.

CHIEF ENGINEER'S REPORT.

March 31. 1905.

The Commissioners,
National Transcontinental Railway,
Ottawa, Ont.

SIRS,—I have the honour to submit the following report on the progress of the exploratory and preliminary surveys for this railway, between Moncton and Winnipeg, up to March 1, 1905, the distance between Moncton and Winnipeg being estimated at 1,890 miles.

ORGANIZATION.

The organization for the carrying out of these surveys was as follows:—

Mr. M. J. Butler was appointed assistant chief engineer.

The entire distance was divided into six districts, giving an average of 315 miles to each, though actually the more accessible districts considerably exceeded this length, while the inaccessible ones were considerably decreased in length.

The districts are approximately as follows:—

District 'A,' from Moncton to the boundary between the province of New Brunswick and Quebec, under Mr. Guy C. Dunn, district engineer, with headquarters at Fredericton, N.B.

District 'B.' from the last mentioned boundary to the vicinity of longitude 74° west, under Mr. A. E. Doucet, with headquarters at Quebec, P.Q., and Mr. S. R. Poulin, his assistant in the field. The section in the vicinity of the Quebec bridge from St. Jean Chrysostome to the county line between Quebec and Portneuf, a distance of say 17 miles, which would be included in District 'B,' was placed under Mr. E. A. Hoare, with headquarters at Quebec, P.Q.

District 'C,' from the vicinity of longitude 74° to near the provincial boundary between Quebec and Ontario (east of Lake Abitibi) under Mr. A. N. Molesworth, district engineer, with headquarters at Ottawa, Ont., and Mr. A. T. Fraser and Mr. G. H. Garden, assistants in the field.

District 'D,' from near the last-mentioned provincial boundary to near longitude 84° west, under Mr. John Aylen, acting assistant district engineer, with headquarters at New Liskeard, Ont.

District 'E,' from near longitude 84° to near longitude 89° 30′, under Mr. C. E. Perry, district engineer, with headquarters at Nipigon, Ont., and Mr. C. F. Hannington, assistant in the field.

District 'F,' from near longitude 89° 30′ to Winnipeg, under Major A. E. Hodgins, with headquarters at Winnipeg, Man.

INSTRUCTIONS TO ENGINEERS.

District engineers were furnished with printed instructions for their guidance and for that of the engineers in charge of parties under them, giving full particulars as to their various duties. They were also instructed to adhere to grades not exceeding 0·4 feet per 100 adverse to eastbound, or 0·5 adverse to westbound traffic, though in regard to the last mentioned this has been changed to 0·6 per 100 in one or two exceptional cases. The maximum curvature was limited to 4°.

ORGANIZATION.

District 'A.'—On September 27, Mr. Guy C. Dunn, who had been appointed acting district engineer for that district, organized and started out six survey parties, and during the following month six more parties; two of these, however, were disbanded before the end of December.

Commencing at Moncton and extending through to Quebec boundary, a large area of country has been explored, and preliminary surveys have been made to Chipman on the Salmon river, and thence by what is known as the Back route up the valley of the Gaspereau river, and passing south of Boisetown to the head waters of the Texas and Miramichi rivers, thence to near Plaster Rock, then to Grand Falls and Edmundston. and connecting with the surveys made in District 'B,' at a point about 20 miles beyond the province line.

Another route was surveyed branching off the foregoing near Chipman, striking the valley of the St. John river and crossing it at Fredericton, thence following the west side of the river to Woodstock and Andover, and re-crossing the river at the last mentioned point, thence to Grand Falls, where it joined the back route survey.

On both these routes many pieces of alternative lines were run or explored. The total distance by the back line from Moncton to the Quebec boundary is, say, 294 miles. which distance will probably be shortened on location. By the river route the distance is 311 miles, but will probably be lengthened on location.

Total mileage covered in this district was, of barometrical explorations, 2,900 miles; preliminary lines, 1,320.

Grades 0·4 adverse to eastbound and 0·6 adverse to westbound traffic, with maximum curvature of 4° were obtained, except the curvature which may require the use of several 6° curves.

Details of these surveys and comparison of routes are fully given in Mr. Dunn's report, given below.

ENGINEER'S OFFICE, DISTRICT 'A.'
FREDERICTON, N.B., March 20, 1905.

HUGH D. LUMSDEN, Esq.,
Chief Engineer, Transcontinental Railway Commission,
Ottawa, Ont.

SIR,—I beg herewith to submit the following report of general progress of preliminary and exploration surveys on District 'A,' from date of organization and commencement of work in the latter part of September, 1904, to the first of March of this year.

ORGANIZATION.

I arrived at Moncton, N.B., to take charge of operations on this district on the 24th of September last, under instructions from you to run a preliminary survey from Moncton in as direct a line as possible to a point in the province of Quebec south-we t of Long lake, and also to run an alternative line from some point at or near the Salmon river to Fredericton, and by the valley of the St. John river to a junction with the first line at Grand Falls. On the 27th of the same month I started six survey parties into the field and during the following month six more were sent out, making a total of 12 parties, one of these being a small one was employed making traverses and contours of the Salmon river. this latter. with one of the main parties, was disbanded at the end of December, and another was laid off at the end of February.

Of these 12 parties, 9 were continuously under canvas, the small river party boarded in farm houses, and the remaining two ran part of their survey from hotels, the balance of the time being in tents.

DISTRICT ENGINEER'S OFFICE.

A head office for myself and staff was opened in October in Fredericton, the latter place being chosen as most central for the work.

ROUTE OF SURVEYS.

On February 28 a continuous line of survey had been run from Moncton westward to a point near Chipman on the Salmon river, thence across to Fredericton, crossing the St. John river at that point, and from Fredericton to Andover along the west bank of the river, passing through the town of Woodstock, recrossing the St. John river at Andover and continuing along the east side of same to Grand Falls. Also an alternative line from Andover on the west side of the river, necessitating a crossing of the Aroostook river, and recrossing the St. John river again at Grand Falls. The surveys over this latter portion from Andover to Grand Falls show a much less desirable line than the one on the east side of the river.

The foregoing line, as described between Chipman and Grand Falls, is commonly known as the 'river survey.'

Another line was run from the aforesaid point near Chipman on the Salmon river to and up the valley of the Gaspereau stream, thence in a westerly direction crossing the Intercolonial railway south of Boisetown, and passing by the headwaters of the Texas river and the Miramichi to the Tobique river near Plaster Rock, and from this point to Grand Falls; the latter survey being known as the 'back line route.'

From Grand Falls, which is the point common to both surveys, a continuous line has been run to Edmundston and westerly along the south shore of Long lake to a point about 20 miles into the province of Quebec, at which point a connection is made with surveys being run in District 'B.'

Irrespective of those surveys outlined above, a more direct line between Moncton and the headwaters of the Texas river is now being run, which will shorten the distance of the back line survey by many miles. There is also being run another line north of Long lake from the New Brunswick boundary to a connection with District 'B' surveys in Quebec. As well as the main line above described, there have been many alternative and abandoned and exploration lines run which are included in the total mileage of work done to March 1st as given below.

CHARACTER OF LINE GRADES.

I am pleased to be able to report that your instructions in regard to grades and curvatures have been successfully carried out, and our maximum grade rising westward will not exceed a compensated grade of 0·6 per cent, or 31·68 per mile. Rising eastward, of 0·4 per cent compensated, or 21·12 per mile.

The percentage of curvature all through on both routes will be light, the back route much less than the river, and in no case will a curve in excess of 6° be necessary, and very few of these will be required.

Location will, with the exception of one or two points, materially shorten distance on the back line and will increase distance on the river route.

BALLAST PITS.

Gravel of fine quality is found through this district, and although the deep snow of this winter has made it difficult to find out the exact nature of the soil over which parties are running, I believe that ballast in quantity will be found at reasonable distance all along the lines of survey.

CHARACTER OF COUNTRY TRAVERSED.

The line from Moncton to Salmon river, near Chipman, with the exception of a few miles, is run on land either cultivated or adapted for farming purposes when the spruce, cedar and hardwood timber now growing there is taken off, the soil varying from clay loam to light gravel, no rock of any account appearing on the surface, and indications of coal being found in many places near the Salmon river.

From Chipman to Fredericton very little of the country passed through is under cultivation, but the greater part is adapted for same. The Minto coal mines are close to the route of survey and about fourteen miles west of Chipman. After crossing the St. John river the city of Fredericton is reached and the line is continued up the valley of the river through the town of Woodstock and the village of Andover to Grand Falls through a rich and well settled farming country.

On the Back Line Survey, between the Salmon (near Chipman) and the Tobique rivers, the lines pass through an almost entirely unsettled country covered with spruce, birch, cedar and hardwood, extending for at least five to ten miles (in many places much farther) on each side of the proposed line, some of the birch which I saw growing being very large and of fine quality. The soil over this whole section, with the exception of a few miles of sandy plain, is fit for cultivation, well watered, and at present probably the most magnificent game district in the Dominion: moose, red deer and cariboo being plentiful, it not being an unusual sight to see fourteen or fifteen of the latter in one herd. The Salmon, Miramichi and Tobique rivers are well stocked with salmon.

From the Tobique river to Grand Falls is an excellent farming country, over half of the whole distance being now settled.

From Grand Falls to a few miles above Edmundston where the line leaves the St. John river the land is all taken up and cultivated by well-to-do French Canadian farmers.

After leaving the valley of the river the line runs to the boundary between the provinces of New Brunswick and Quebec, near the head of Baker's lake. This district is practically unsettled with the exception of a well-to-do settlement around the latter lake.

DISTANCES RUN.

River Route.

	Miles.
Moncton to Grand Falls, via Salmon river (near Chipman), Fredericton, Woodstock and Andover	249
Grand Falls to Edmundston	37
Edmundston to boundary between New Brunswick and Quebec	25
Boundary to junction with Parties District 'B'	22
Total distance	333

Back Route.

	Miles.
Moncton to Grand Falls	232
Grand Falls to Edmundston	37
Edmundston to boundary between New Brunswick and Quebec	25
Boundary between junction with Parties District 'B'	22
Total distance	316
Difference in favour of Back Line	17

EARTH AND ROCK QUANTITIES.

The quantities per mile as shown by the profiles over the entire district will be light, and those on the back line will be considerably less per mile than the river route. Owing to the deep snow it has been impossible to do anything more than get an approximate classification, but I can state positively that the percentage of soild rock will be very small.

PRINCIPAL STREAMS TO BE CROSSED.

Between Moncton and Grand Falls on the river route the Canaan river requires a span of about 150 feet. Then a crossing of the Salmon river at a point near Chipman has 300 feet of bridging.

	Feet.
Newcastle	100
Little river	150
Burpee's mill stream	150
Bartlett's mill stream	100
St. John river (1st crossing)	1,800
Shogomoc	150
Eel river	200
Maduxanakeag	200
Upper Guisiguit	100
Lower Guisiguit	100
River de Chute	150
St. John river (2nd crossing)	1,200
Little river	150
Salmon river	200

Between Moncton and Grand Falls on the back route the Canaan will be crossed, requiring a span of 125 feet.

Salmon river (near Chipman), 150 feet.

Cain's river, 150 feet.

Jewett's brook, 100 feet, with considerable viaduct approach on the west side.

South-west Miramichi near the forks of the north branch, 200 feet.

Tobique, 300 feet with high crossing.

Salmon river (near Grand Falls), 150 feet with heavy viaduct approach.

Little river, 1,200 feet of viaduct.

And from Grand Falls to Edmundston the Grand river will be crossed with 150 feet, and the Green river with 125-foot span. The Madawaska river at Edmundston, 300-foot span with considerable viaduct on each side, and from Edmundston to the junction with the Quebec district, there are no streams of any size to be crossed. The estimate of bridging as given above in feet is only approximate, subject to change by location.

SMALL STRUCTURES REQUIRED.

The small bridges and culverts on the back line are comparatively few and small in size; on the river route, however, as is always the case when a line runs along the shore of a large stream, the smaller culverts are much more numerous, and openings required will be larger, probably they will average 100 per cent more, mile for mile, than they will on the back survey. From Grand Falls to the Quebec district the smaller streams will be moderate in size and number.

CROSSINGS OF OTHER RAILWAYS.

On the river route between Chipman and Fredericton two level crossings of the New Brunswick Coal and Railway Company's track will be required. one level crossing

of the Canadian Pacific Railway at Woodstock and one overhead crossing of the same railway at Andover. On the back line survey a crossing of the Intercolonial Railway is necessary several miles south of Boisetown, which I expect to cross overhead. Between Grand Falls and Edmundston our present preliminary line shows two level crossings of the Canadian Pacific Railway, which, on location, I believe can be eliminated, and at Edmundston the Temiscouata Railway will be crossed at a high level.

MILEAGE RUN.

The total mileage run by the parties from the commencement of operations in September last to March 1, 1905, is as follows:—

Preliminary instrumental lines, 1,320·2 miles.
Barometrical explorations, 2,970 miles.

PERSONALITY OF STAFF.

I cannot speak too highly of the engineers and assistants appointed on this district. The work has been under the most severe and extraordinary conditions, and has been deserving of great praise, as it must be remembered that the winter of 1904-5 is a record one for this province, the thermometer for weeks at a time being below the zero mark and being registered at Fredericton as low as 45°, and at Grand Falls almost 10° lower. The snow also in many places, more particularly in the central part of the province, was over five feet deep and soft without any crust, thereby making moving camp, exploring and the routine work on the line, more especially to those parties who were obliged to move their camp over a portion of their work by sledges and toboggans, a most severe and laborious undertaking.

The discipline of the men has been excellent, only in a very few cases have any removals been made.

GUY C. DUNN,
District Engineer.

ENGINEER'S OFFICE, DISTRICT 'A,'
AT OTTAWA, March 31, 1905.

HUGH D. LUMSDEN, Esq.,
Chief Engineer, Transcontinental Railway,
Ottawa, Ont.

SIR,—I beg herewith to submit the following supplementary report to accompany my general report of March 20.

I estimate that if a 1 per cent grade was used on the general route of back line surveys run last winter, that a saving of 57 miles of distance could be made as follows, viz.:

	Miles.
Moncton to Grand Falls	50
Grand Falls to Quebec boundary	7
	57

Location on our light grade line on the back route will shorten the distance by probably at least 12 miles, making a total distance from Moncton to Quebec boundary not over 288 miles.

GUY C. DUNN,
District Engineer.

DISTRICT 'B.'

ORGANIZATION.

The first of eleven survey parties in this district was sent out on October 10, 1904, from which date to March 1, 1905, a large area of country has been explored and examined, some 677 miles of exploratory and 540 miles of preliminary surveys having been run.

GRADES.

The results of these surveys have proved that for the entire distance (423 miles) from the boundary between the province of New Brunswick and Quebec, near Lake Baker to the westerly limit of this district near longitude 74° west, grades not exceeding 21·12 feet per mile opposed to eastbound and 31·6 feet per mile opposed to westbound traffic have been obtained, and the last mentioned grade has only to be made use of in a very few cases. The curvature was limited to 4°, but it has been found necessary to use 6° curves at two or three exceptional points.

The portion included between St. Jean Chrysostome on the south, and the boundary between the counties of Quebec and Portneuf on the north side of the St. Lawrence river was put in charge of Mr. E. A. Hoare, and his section also includes the approaches and terminals for Quebec city.

Mr. Doucet's report, given below, together with plans and profiles, give you full details of these surveys.

QUEBEC, March 21, 1905.

HUGH D. LUMSDEN, Esq.,
Chief Engineer, Transcontinental Railway,
Ottawa, Ont.

SIR,—Conforming to your request that I should inform you of the work done in District 'B,' from the inception of the surveys to the first of March, I beg to report as follows:—

ORGANIZATION.

The Commissioners met in Quebec on the 3rd of October, and after two days' deliberation, I was instructed on the 5th to proceed as quickly as possible with the formation and equipment of eleven engineering parties, and to run a preliminary line of surveys from Quebec boundary west of Edmundston, at or near Lake Baker, to a point about fifty miles west of the St. Maurice river, the western division between my district 'B' and District 'C,' in charge of Mr. Molesworth, being an imaginary north and south line passing through Lake Clear.

I accordingly set to work with all possible diligence and on October 10 I was in a position to report to you that parties No. 1 and 1A., were leaving Quebec for their scene of operations on the 11th, at St. Alexandre, county of Kamouraska; party No. 2 was leaving Quebec Tuesday 11, for St. Jean, Port Joli; party No. 3, on the 11th, for L'Islet; party No. 4, on the 11th for St. Jean Chrysostome; party No. 5, on the 11th, for Belair; party No. 6 on the 12th, for St. Genevieve; party No. 7, on the 13th, for Grandes Piles; party No. 8, on the 11th, for St. Genevieve; party No. 9, on the 13th, for La Tuque, and party No. 10, on the 13th, for Joliette.

ASSISTANT DISTRICT ENGINEER.

According to a previous understanding with you, I had obtained your consent to nominate Mr. S. R. Poulin as my assistant on the eastern portion of my district. As I knew this to be a difficult piece of location owing to the abrupt fall of the country from the height of land to Lake Pohenegamook, I considered it most important that an

engineer in whom I had full confidence should be sent ahead of the parties about to start work at this point to explore the country before their arrival, so as to be in a position to then instruct them as to the proper course to follow with their preliminary lines.

COMMISSARIES.

I also arranged with you that I should have four commissaries, or transport officers, to look after the distribution of supplies and to ensure their safe delivery to the different parties in the field. One commissary was assigned to parties 1, 1A and 2; another to parties 3 and 4; a third to parties 5, 6, 8 and 10, and the fourth to parties 7 and 9.

INSTRUCTIONS GIVEN.

As you are aware before starting upon this work I was convinced from my previous knowledge of the engineering features of my district with which I had become familiar owing to the surveys I had formerly been in charge of for the Trans-Canada Railway, that a line could be had possessing all the essential conditions required in the instructions received from you in the way of grades and curvature. This previous knowledge thus enabled me to assign to each party a section of country of which I had ample information, so that no time was lost in starting operations after reaching the starting point. Verbal instructions were given to each engineer in charge before leaving Quebec and in order to ensure the proper carrying out of these instructions, a written circular was delivered to each chief of party, the following addressed to the engineer of party 3B, being taken as an example:

'Confirming the verbal instructions I gave you prior to your departure from Quebec, regarding the work alloted to you of making a preliminary survey, which has been entrusted to your care by the Commissioners of the Transcontinental Railway, your section will start at the western boundary of the township of Buckland, two miles north of Notre Dame Auxiliatrice, or in cross lots of the township of Armagh, some six miles further north, and extend eastwards to where the main public road leading southward from L'Islet Station on the Intercolonial Railway, crosses through the township of Arage, in the vicinity of Lac de la Fontaine Claire. You have been given a general map of the district, and also the Cadastral plans of the different townships through which the line will run, and also the general instructions issued by the chief engineer, and a specimen map of plan profile.

You are limited to gradients of 4-10ths both eastwards and westwards, and the maximum curvature must not exceed four degrees. Though the general direction of the route to be followed has been laid down for you, you will carefully explore the country to the right and to the left of the line, and no possible line must be neglected until a careful examination has shown clearly that such a line is impracticable from the point of view of excessive gradients and curvature. You have been given sufficient provisions to last you one month, and a further lot will be sent you in care of the commissary officer before these have been used up. You are to report to me in writing at Quebec at least twice a month, and oftener if possible, so that I may always be in touch with you to advise you further if necessary. I rely upon you to keep proper discipline in your party and to see to the comfort and well-being of the men under your charge whilst at the same time being very careful to see that every man does his work faithfully. My assistant, Mr. Poulin, will visit you from time to time and give you all the help in his power.

At the western end of your section you will tie on to a line being run by party 4, which is starting operations from St. Jean Chrysostome eastwards, and on the eastern boundary of your section to a line being run by party 2. In case these parties should not have reached the appointed terminus before you, you will be careful to leave proper reference posts and bench marks, as required in the general directions, which may be easily found by these gentlemen.

The elevation should be taken from the Intercolonial Railway opposite L'Islet station, the elevation of which is 104 feet above sea level, and this line of levels should be carried along the highway to your starting point.

I am sure that your previous knowledge of railway surveys will enable you to carry out your work to the entire satisfaction of the Commissioners and the chief engineer, and I will always be glad to help you with any advice and instructions.'

DIVISION OF SECTIONS.

My district was divided into the following sections:—

To party 1A was assigned the section from the head of Long Lake to a point on the road leading from St. Alexander, and some 20 miles south of the Intercolonial Rail way station at this point, a distance of 36 miles.

Party 1, was instructed to start from this latter point and run westwards to join party 2, at the St. Philip road, a distance of 23·5 miles.

Party 2, was to run a line from the St. Philip road westwards to St. Marcel, where a junction was to be made with party 3, a distance of 40 miles.

Party 3, was instructed to start from a point near St. Marcel, working westwards to meet party 4, at St. Philemon, a distance of 34 miles.

Party 4 was given orders to start operations at St. Jean Chrysostome, on the Intercolonial Railway, and to run a line southwards along the Etchemin river to somewhere opposite the Abenaquis river, thence up the Abenaquis river to St. Damien, Notre Dame and St. Philemon, a distance of 74 miles.

Party 5, had orders to start from near the Canadian Pacific Railway on the bound ary line between the counties of Portneuf and Quebec and run westward paralleling the Canadian Pacific Railway to the south until opposite St. Basile, where a crossing of that railway was to be effected, and to then run westwards to St. Alban, on the St. Anne river, and in the same general direction to the Batiscan river, where a junction was to be made with parties 6 and 8, a distance of 60 miles.

Party 8 was to start two miles north of St. Stanislas on the Batiscan river, follow ing that river for some fifteen miles and then strike north-westwards to Reed's camp, on the Great Northern Railway, which was to be crossed at this point. The route was then to be via the Eau Morte river to Lac Brochet, thence to St. Maurice river and La Tuque, where the line was to be joined to that of party 9, a distance of 56 miles.

Party 9 had orders to start at the top of La Tuque Falls of the St. Maurice river, crossing the river at this point and to follow the western shore of the river to the Vermillion river, which was to be ascended to the height of land between it and the Flamand river. The Flamand river was to be crossed somewhere near its junction with the St. Maurice river and this latter river was to be followed to Waymontachene, where proper reference posts and bench marks were to be erected so as to be easily found by a party of district 'C,' which was to make Waymontachene its terminal. This section comprised a distance of 81 miles.

As the Commissioners had found it advisable to run two lines from the St. Maurice river westwards, one to the south of Lake Abitibi and one to the north, you instructed me to cross the St. Maurice river with the former line somewhere near Grandes Piles, and to proceed westwards via the Mattawin river, I accordingly directed party 6 to start at the Bastiscan river running westwards to the Little Piles, crossing the St. Maurice river at this point, and to follow the river to somewhere near the junction of the Mattawin and St. Maurice rivers, joining on at this point to party 7. This section had a length of 34 miles.

Party 7 was instructed to start at the mouth of the Mattawin river, ascending this river to the River du Castor Noir. This river was to be followed until near the height of land; from this point a westerly course was to be taken along a chain of lakes in the direction of Lake Clear, where proper reference posts and bench marks were to be so established as to be readily found by a party of District 'C,' which was to be instructed to tie on to party 7 at this point. This section had an estimated distance of 48 miles,

which, however, might be considerably lengthened by the difficulties which I knew existed on this route.

Party 10, in order to ascertain if a possible location for the railway existed west of the St. Maurice river, starting from Lake Clear down the Rivière du Poste to St. Michel and on to Joliette, from this point branching into Montreal, and also following the general direction eastwards of the Great Northern Railway by Garneau Junction and the Batiscan river, making a junction at this point with the line run from Quebec by party 5, it was thought advisable to start a survey party from Joliette, following the Assumption river northerly to the height of land between the head waters of the Assumption and those of the Mattawin river, following the latter river to St. Michel, where a crossing was to be made, and the line was then to proceed up the Rivière du Poste to Lake Clear, making a junction at this point with party 7, the whole of this section having an estimated distance of 112 miles.

From the above it is easily seen that my district was so divided up and apportioned as not to ignore any possible route from east to west. The only way of penetrating through the Laurentian range of mountains to the height of land between the St. Lawrence river and James bay waters is by following up the large rivers which take their rise at the height of land at an elevation of from 1,200 to 1,450 feet above sea level, and though I am personally convinced from previous explorations made in this district that the valley of the St. Maurice river offered the greatest advantages, from a railway engineering point of view, the only way to settle this matter definitely and for all time was to run such lines as would readily prove which was the easiest route to follow from Quebec westwards.

Your instructions in this respect have been faithfully carried out, and I hope to soon be in possession of all information necessary to enable you to form a decision based on the certain knowledge of the physical characteristics of the country in which our parties have been operating.

DESCRIPTION.

Starting at the eastern end of my district, the elevation of the line is some 600 feet above sea level. Between this point and the St. Lawrence river at Quebec the location has to be taken up to an elevation of 1,580 feet, and then down again to 150 feet above sea level at the Quebec bridge. The line between Lake Pohenegamook and the Etchemin river is taken through the Alleghany Mountains, a beautiful range of hills following the general course of the St. Lawrence and from 10 to 25 miles south of the river, generally well wooded and supplied with rivers and streams, which, as a rule, are well stocked with fish. The timber has in a great many places disappeared under the axe of the lumberman, that is, the pine and spruce, but except in the immediate vicinity of the villages along the route of the railway, the whole of the ground is covered with maple, birch, ash, whilst at intervals here and there one still meets with groves of pine and spruce trees. Cedar of good quality is also met with all along the route. On my visits to the different parties, I have seen the farmers clearing land and burning up spruce trees 12 inches at the butt, and for which they had no use, as the settlers are so far removed from available markets for their lumber. On account of the easy grades required, we have had to follow the valleys of the different rivers and streams as far as possible, and the highest summit met with between Lake Pohenegamook and Quebec occurs near St. Paul, in the county of Montmagny, where the line attains an elevation of 1,580 feet above sea level, this being the dividing point between the waters flowing into the St. John river and those running down to the St. Lawrence river. Though the land has a high elevation, it is, generally speaking, of very good quality, as the different settlements along the route easily demonstrate. The best farms, as a rule, are situated on the hills away from the valleys, and I am told the farming season in the interior is, if anything, longer than on the coast of the St. Lawrence river. Years ago, at confederation, the Quebec government, in order to settle this part of the country, undertook the construction of a highway running from west to east, some 25 miles back from the

parallel to the St. Lawrence river. This road begins from Notre Dame de Buckland, in the township of Buckland, and runs through the townships of Patton, Arago, Garneau, Lafontaine, Chapais, Painchaud and Pohenegamook. This road has not been kept up in these two latter townships. As the whole of this highway will be of the greatest value, and I may say, of necessity to the construction of the Transcontinental Railway, it is imperative that the second growth of trees on the last fifteen miles should be cut down, and the roadbed graded anew, so that through communication may be established by the Tace road from Lake Pohenegamook to Etchemin river. A sum of $15,000 would, in my estimation, be sufficient for this purpose. Settlements have been made at different points along the road, but, of course, no great development could be expected, as the country has been left without railway facilities, and the long haul from the settlements to the Intercolonial Railway renders almost prohibitive the selling of farm produce and timber at remunerative prices to the farmer. The construction of our new railway in this district will, I am positive, be the cause of the establishment of several new thriving settlements, as the essentials of good land, good timber and good water are all at hand.

From Quebec westerly the railway runs through a settled country to the Batiscan river, some 70 miles and on this portion no engineering difficulties are met with; the gradients and curvature are easy, and the Jacques Cartier, St. Anne and Batiscan rivers are the only points which will require more than an average outlay for constructions.

From Reed's Camp northwesterly, there are no settlements whatever, and the country is still the haunt of the lumberman and the trapper. On the St. Maurice river around and above La Tuque Falls some 5,000 lumbermen are kept constantly at work during the winter months, and the mills at Grand Mere, Shawenegan Falls and Three Rivers are all supplied from this point. The timber limits are taken up as far northwesterly as Waymontachene, but above this point the land and timber are still in the possession of the Quebec government. A good deal has been said of the small growth of timber at the height of land, but our engineers report that at Waymontachene and north, spruce grows to a size of 36 inches at the butt. I have not been able to get positive reports as to the value of the land on this portion of the line, from an agricultural point of view, as the country has been covered with snow since our parties reached it in January, but all previous reports which I have had are to the effect that a great deal of the land is fit for cultivation, and the advent of a railway will doubtless be the means of the establishment of large and thriving settlements wherever a water power, for which the St. Maurice river is famous, occurs along the route of the railway.

From the Batiscan river westerly to the Mattawin river the country is thinly settled, and the character of the soil is sandy. No good crossing of the St. Maurice river has been found, and though the one we have actually taken may be somewhat improved, it would at best be a very expensive and almost prohibitive one. The St. Maurice valley at this point is cut up by innumerable wide and deep gullies, necessitating the construction of very expensive viaducts. Could we use grades of 52 feet to the mile we would doubtless obtain a fairly cheap line, but as we are limited to grades of 21 feet to the mile, we are compelled to cross these several gullies at a very high elevation and to take a crossing of the St. Maurice river some 200 feet high and 1,000 feet wide.

The valley of the Mattawin river is narrow and the water very rapid, fall after fall occurring in short distances. We have found it advisable to leave this river as soon as possible and to grade up the Gros Castor Noir river in order to attain a fairly level country, which I am told, extends from this river to Lake Clear. I will not be in a position to give you sufficient information of the character of this country to enable you to accept or reject this line until April, when I hope our engineers will have reached Lake Clear.

Returning to the work in detail of the several parties in my district:

SESSICNAL PAPER No. 62c

WORK DONE BY PARTIES.

Party 1 A, under the charge of Mr. C. A. Macallum, has run a preliminary line from the north end of Lake Long, in the township of Cabano, to the foot of Lake Pohenegamook, crossing the St. Maurice river at this point. The valley of the river is about one mile wide, and a viaduct 125 feet high and about one mile long will be required to cross the valley on this route. The line then loops around Wild Cat brook and runs up Lake Pohenegamook to the Smoky river, which is crossed by a viaduct 1,000 feet long and 175 feet high, and proceeds up to the St. Alexandre road, which it crosses at a point marked 'A' on the plan, some twenty miles south of St. Alexandre station on the Intercolonial Railway.

A line was also tried from the point A above referred to, to Lac Des Cedres, in order to establish the summit between the St. Alexandre road and the St. Maurice river, which was found to be 1,360 feet. This line would be useful in case we decided later on to grade down the St. Francis river to Lake Pohenegamook, but even by using this route we would still have the two bad crossings of the Smoky river and the St. Francis valley. The grades opposed to westbound traffic are 6.10, and those to eastbound traffic 4.10, and but one 6 degree curve would be required on this stretch at the loop around Wild Cat brook. In order to eliminate the two bad crossings above referred to, Mr. S. R. Poulin, after careful exploration of the surrounding country, and after consultation with me, decided to cross the St. Francis valley at an elevation of ten or twelve feet above the level of the bottom of the valley and to grade up the western slope of Lake Pohenegamook to the point marked 'B' on the plan, where a loop, using a six degree curve is made, and the gradual ascent continued in a southerly direction to the foot of Lake Pohenegamook, where the line curves to the westward and follows the south branch of Wild Cat brook to its source, and continues in this direction till the valley of the River Noir is reached.

The direction of the line is then northwesterly following the valley of the River Noir, which it crosses at point marked 'C' on the plan, and where a junction is made with the line being run by party 1. The lines which have been actually run on the ground are denoted on the plan by a continuous line, and the lines still incomplete are marked by a broken line.

I am happy to be able to state positively that a comparatively cheap and easy line has been obtained on this section, and that we have kept well within the limits of grades and curvature assigned to us.

Lake Pohenegamook is a beautiful sheet of water, and its shores are dotted with well kept houses of the farmers. There is still a considerable amount of good wood in the township of Chabot, Pohenegamook and Bungay, and the cedar of Bungay particularly will be of great assistance in the construction of the railway.

At the end of December it was found advisable to reorganize party 1 A, as the former engineer in charge, transitman and topographer had not given satisfaction,—not that they did not work hard and to the best of their ability, but their want of experience in railway surveying prevented them from obtaining the best results in the shortest space of time and at the least expense. The party, as now constituted, is giving perfect satisfaction, and the first and second preliminary lines will be completed in ample time to begin location as soon as the snow disappears.

Party 1.

In charge of Mr. E. H. Pierce, has been working from the St. Alexandre road at point 'A' on the map, in a westerly direction, passing north of Lake Rocheux, where the line attains an elevation of 1,360 feet above sea level. The ascent continues until the summit between the St. Francis river and River Noir is attained at an elevation of 1,430 feet. From this point the line falls to the River Noir, which is crossed at an elevation of 1,300 feet, when the direction is northwesterly till the southern end of Lac

aux Loutres is reached. At this point the line turns to the southwest and continues on till a junction is made with party 2 at the government road leading to St. Pascal on the Intercolonial Railway, marked 'D' on map. This section, though it will be comparatively cheap of construction, is still a hard piece of location, as the knolls and ridges overlap one another, and to strike the right line at the first trial would be more a matter of luck than good judgment. We have secured the required grades and curvature on the portion already run, and a very careful exploration has been made of the remaining seven miles of this section, so that we are certain of attaining like results throughout the whole distance.

The land in Painchaud is good agricultural land, and the maple groves of this same township to the south of the Tache road cannot be surpassed anywhere. There is no settlement here, however, as the highway has been allowed to fall into decay, and were the road to be opened up again, with the close proximity of the railway, there can be no doubt that this portion of the township will be quickly settled.

The organization of this party also was not satisfactory at first, so that it became necessary to change the engineer in charge. Since the beginning of January, when Mr. Pierce was appointed, the results have been most satisfactory, and we will be enabled to proceed with our location as soon as the snow disappears.

Party 2.

In charge of Mr. P. C. Talbot, started work south of St. Marcel, in the township of Arago, on the road leading from L'Islet, on the Intercolonial Railway, at point marked 'E' on map. The route followed is through the savanne, noted on the map, which is at an elevation of 1,170 feet above sea level. It then follows the River Grande Coulee for some seven miles, when it falls into the valley of the River Ouelle, and crosses the road leading from St. Jean, Port Joli, on the Intercolonial Railway, about one mile north of St. Perpetuee, at an elevation of 1,260 feet. The course of the line is then northeasterly, and passes one mile south of Lake St. Anne. From this point the line continues in the same direction from one to three miles north of the Tache road, the summit between Lake St. Anne and the government road at the terminus of sections 1 and 2, being 1,420 feet above sea level, and from this point the line falls to elevation 1,340 at the junction point of the two parties. From St. Marcel to Lake St. Anne the country is fairly well settled, and the villages of St, Perpetuee and St. Phamphile are, or will be, points of considerable traffic in lumber and farm produce. From St. Perpetuee to the government road the country is not settled, but the land is good agricultural land, and there is some very good timber still standing. Lake St. Anne is a very pretty sheet of water, and a good fish and game club house is erected here in charge of a guardian. Lac de l'Est, further to the south, is also a beautiful lake, and it is my intention to make an exploration of this part of the country to see whether it would be possible to locate a line directly from River Noir, from where the line run by party 1A reaches this valley, to Lac de l'Est, then up to Lac a la Truite to Lac St. Anne. I am afraid that the valley of the River Noir will prove a very serious obstacle on account of its depth, but an exploration line will settle this point, and I hope to have this point finally determined before the snow goes off the ground.

The preliminary line on this section is finished, with the exception of some six miles at its eastern end. This once done, the party will revise its preliminary line at two or three important points.

Party 3.

In charge of Mr. C. Garnet, started from a point two miles north of St. Marcel and ran a line to Lac Violon, but as the country was rising too quickly for our grade the party was turned back and started south of St. Marcel at the savanne, above referred to. The line then followed the valley of the River Noir to Lake McKim (elevation 1,260 feet) and then up the River du Veau, which is crossed at elevation 1,500;

the line then loops around to the south, passing by Lake Joly and on to Lac Boilard, which has an elevation of 1,640 feet. As this summit is only some 1,500 feet long, a deep cut might be made so as to reduce the summit between Lake Pohenegamook and Quebec to 1,600 feet. From Lac Boilard the line continues on to St. Paul, which is at an elevation of 1,540 feet, and St. Philemon, marked F, elevation 1,360, where a junction is made with party 4, working easterly from St. Jean Chrysostome on the Intercolonial Railway. In order to see if it would not be possible to get a lower summit than that at Lac Boilard, a preliminary line was also run by this party following the River du Veau to Lac Long, which has an elevation of 1,580 feet. From this point the line turned westerly to River du Moulin and joined in to the first preliminary at St. Paul. The line though longer will be 60 feet lower, and I am waiting for further information before I finally decide which line should be adopted. The country between St. Marcel and St. Philemon is fairly well settled, and the state of the different houses along the Tache road shows that the people are in comfortable circumstances. The farms seem to be well looked after, and the people having shorter connection and better roads leading to the Intercolonial Railway, evidently feel the effects of being nearer a market at Quebec for the produce. On making inquiries I was informed that the soil is of a good quality, well watered and the back woods to the north of Etchemin river are still well timbered.

As I was not satisfied with the progress made by this party in October, November and December, I had to recommend a change of engineer in charge. Mr. Garnet was appointed on the first of January, since which time the progress and the results obtained have been most satisfactory.

Party 4.

In charge of C. A. d'Abbadie, started operations at St. Jean Chrysostome on the Intercolonial Railway, near Levis marked 'G' on plan, and ran a preliminary line up the Etchemin river to a point opposite the Abenaquis River. They then moved up to the summit of Lac Vert (elevation 1,248 feet) and ran down grade westwardly on the Abenaquis river, using a 4-10th grade. This grade brought them to the Etchemin river, about four miles south of St. Malachie, where a good crossing was effected, and the down grade continued on the west bank of the Etchemin river until they tied on to the line previously run to the crossing of the Quebec Central Railway. We thus have a continuous 4-10th grade for some 40 miles from St. Jean Chrysostome to Lac Vert. From Lac Vert the line has to make a long loop around the River aux Originaux, as the ground between Lac Vert and St. Philemon falls very much too quickly for our grade.

This part of the country is well settled, Notre Dame and St. Damien being quite large villages with good houses, churches, school houses, mills, &c. We must take some fairly heavy crossings of streams and gullies in the long grade to the Etchemin river, but on the whole the cost of construction will not be very much above the average. But a few miles of this section are left undone, though considerable revision work will have to be done at several points in order to lighten the work. Party 5, which had finished its work on the north shore of the St. Lawrence river, was sent by me to revise the preliminary line from St. Jean Chrysostome to the crossing of the Quebec Central Railway, as I am under the impression that we can get a much easier line away from the Etchemin river, and passing near St. Isidore and St. Heneďine.

Mr. Hoare ties on to my district at St. Jean Chrysostome on the east and at the boundary between the counties of Quebec and Portneuf on the west.

Party 5.

In charge of Mr. F. A. Hibbard. Very good progress has been made by this party, the whole of its section of 60 miles having been finished with most satisfactory results. A line has been secured throughout with grades not exceeding 4-10ths either east or west bound, and no curves sharper than 4 degrees. The cost of construction should

also be moderate, the only points requiring expenditure above the average being the crossings of the Jacques Cartier, St. Anne and Batiscan rivers. The country throughout is well settled and is altogether a farming country. Several very important villages are met with, but as the line parallels the Canadian Pacific Railway, however, for some 36 miles, we will naturally have to expect a certain amount of competition. The grades on the Canadian Pacific Railway, however, are of 52 feet to the mile maximum, and as our steepest grade in either direction is but 21 feet to the mile, we should be in fairly good position to compete successfully. As the party had finished its preliminary work, and as you did not wish to have the location started before the snow had altogether disappeared, I sent it, as mentioned above, on the south shore to revise a portion of the line staked out by party 4. Great credit is due to Mr. Hibbard for the good work he has done and the satisfactory results of his operations.

Party 8.

This section extends from the Batiscan river to La Tuque on the St. Maurice river. Of the distance of 56 miles, but 15 remain to be run, and we have so far secured the required grades and curvature. That portion of the line between Batiscan river and the Great Northern Railway at Reed's Camp is settled, but from Reed's Camp to La Tuque the country is still in its primitive wildness, except that the best of the timber has been cut out, though the supply of pulpwood remaining is very considerable. Large birch of good quality also exists in large quantities, and if manufactured into square birch should provide traffic for the railway. I also met with cedar north of Reed's Camp, which may be used for ties, as it seems too small for other purposes. The country does not seem adapted to agricultural purposes, and is altogether different from the formation of the south shore of the St. Lawrence. To meet with bare rock is an exception on the south shore, whereas the moment one enters the Laurentian range rock cliffs are in evidence on every side.

The falls of La Tuque offer a water power of 90,000 H.P., and are destined to be the cause of the formation of industries which will outrival Grand Mere and Shawenegan Falls, as the source of timber supply is so much nearer at hand.

Location work is difficult on this section, and the party deserve credit for the hard and good work it has done in securing such good results.

Party 9.

In charge of Mr. B. Bourgeois. The section assigned to this party extends from La Tuque Falls, on the St. Maurice river, to Waymontachene, also on the same river, a distance of 81 miles. The route chosen was from La Tuque Falls following the St. Maurice river for about six miles to River au Lait, which discharges into the St. Maurice river at this point. The River au Lait was then to be ascended to its summit and the line taken down to where the Flamand river joins the St. Maurice, so as to cut out the big bend of the latter river. The line from this point was to follow the St. Maurice river to Weymontachene. The whole of this section has been run with most gratifying results, and the party has returned to La Tuque, where it is now running a lower level line on both sides of the St. Maurice river to the Vermilion river, where an ascent will be made and a junction effected with the first preliminary, about 24 miles from La Tuque, in order to shorten the location and cut out a bad piece of line near La Tuque. We will have to contend with considerable rock work on the first 15 miles of this section, but the cost of construction when divided over the whole mileage will not greatly exceed the average cost.

The timber on the first part of the line, from La Tuque to the Flamand river, has been burnt, but from the Flamand westerly to the height of land the reports are to the effect that the finest spruce and cypress are to be met with, 36 inches at the butt being a common occurrence. The character of the soil is not very promising from an agricultural point of view, but better is to be met with on the James' bay slope.

The St. Maurice river offers an easy means of distribution for supplies and construction material above La Tuque and the new railway which the Quebec and Lake St. John Railway are building to La Tuque, will bring the latter point within six hours of Quebec, so that good progress should be made with the construction of the railway, at least up to the height of land between the St. Lawrence and James bay waters.

I intend trying another line from the St. Maurice river below La Tuque, where the Rat river discharges into the St. Maurice, as I have been informed that a very easy route exists here from the St. Maurice to the height of land. For this purpose I have given Mr. Bourgeois orders to caché any provisions he may have left over when the winter breaks up at Lake Clear, which would be the point of junction between the Rat river line and the first preliminary line.

Party 6.

This section, in charge of Mr. P. E. Mercier, extends from the Batiscan river to Lake Clear, which is the western limit of my district. I originally had two parties on this distance, but, as party 7 was not giving satisfaction, I recommended its being disbanded and the whole distance assigned to Mr. Mercier.

The first fifteen miles west of Batiscan river consist of light work, but the trouble begins when endeavouring to reach the level of the St. Maurice river valley, with grades of 4-10. There does not seem to be a good crossing of the St. Maurice river south of La Tuque, and the bridge we will have to erect across the river, if the line south of Lake Abitibi be chosen, will be some 1,000 feet long and 200 feet high. On each side of the river also several deep gullies have to be crossed, necessitating long and expensive viaducts. Once clear of the St. Maurice river, however, the country becomes more level. The Mattawin river has to be joined about five miles from its junction with the St. Maurice river, as the lower portion of it would require grades of 2 per cent, as it is a continuation of falls and rapids for this distance. The party is now on the Gros Castor Noir river endeavouring to reach a fairly level country some 16 miles back of the Mattawin river, which level is supposed to continue to Lake Clear. Mr. Mercier has gone on ahead exploring, and he sends back word that he hopes to reach Lake Clear with the line about the middle of April.

The Mattawin valley is narrow and rocky, and in my estimation offers a very poor passage for a transcontinental railway. However, we will soon know definitely whether a line with the easy grades and curvature required is at all possible via this route.

There are a great many men employed cutting timber every year on this river, the supplies being taken in from Joliette to St. Michel des Saints by teams, as the Mattawin river is too rapid for portaging economically. The logs are floated down to the St. Maurice river and used at the Grand Mere mills.

The land at St. Michel des Saints is good agricultural land, and there is no extensive stretch of country north of this point which is very favourable for farming purposes.

Party 10.

As previously stated, the purpose of this party was to demonstrate whether a practicable line could be had, leaving the Transcontinental Railway line at Lake Clear and extending south to Joliette, then easterly to Quebec and the east. Some 48 miles of preliminary line were run by this party, but as the results obtained were not satisfactory, principally, I believe, owing to the engineer appointed to take charge not having had any previous practical experience in the management of railway surveys, and as no information of any practical value was to be had by continuing this party in the field, I thought it wise to recommend its being disbanded. The distance covered by the surveys was from Joliette to St. Anne on the Assumption river, and should the suggestion meet with your approval, the survey could again be resumed later on when party 6 will have reached Lake Clear, and this party might then be instructed to run south from Lake Clear to tie on to the end of the line already run by party 10 to St. Come.

COMPARISON OF DISTANCES.

The distance from the Quebec bridge to Edmunston via the present survey of the Transcontinental Railway is as follows:—

From Quebec bridge to St. Jean Chrysostome	6	miles.
St. Jean Chrysostome to Quebec boundary at Lake Baker.	210	"
Quebec boundary Lake Baker to Edmunston	25	"
Total	241	"

Taking the Intercolonial Railway to Rivière du Loup and Temiscouata Railway from Rivière du Loup to Edmunston, the distance would be as follows:—

Quebec bridge to Chandière Junction	5·5	miles.
Chaudière Junction to Rivière du Loup (Intercolonial Railway)	122·5	"
Rivière du Loup to Edmunston (Temiscouata Railway)	81·0	"
Total	209·0	"

It should be remembered, however, that the grades of 125 per hundred feet on the Intercolonial Railway are very much steeper than the gradients we are allowed to use, and that the Temiscouata Railway has maximum grades of 105 feet to the mile. In order, therefore, to make a fair comparison of distances between the two routes, an increase of length sufficient to compensate for reduction of grades to our standard should be added to the Intercolonial Railway and Temiscouata Railway. If we take 33 per cent as a fair addition, this would give 278 miles via the Intercolonial Railway and Temiscouata Railway to Edmunston, as compared with our distance of 241 miles between the same two points. The great loss in distance on our railway occurs from St. Jean Chrysostome, near Quebec, to Lac Vert, at the head of the Abenaquis river, the difference in level between the two points being 1,034 feet. As the grade is opposed to eastbound traffic, we can only use grades of 21 feet to the mile, compelling us to cover a distance of 49 miles, whereas by using grades of 6-10 we could reach the elevation at Lac Vert in a distance of 32 miles. Another great increase in distance occurs at Lake Pohenegamook, where we have to fall 613 feet in 10 miles. These grades being opposed to westbound traffic by using a 6-10 grade, we have to loop around the valleys so as to make the distance 19 4-10 miles. If we could use a 8-10 grade at this place we could reduce the distance by 4·4-10 miles. Between the two places above mentioned we are compelled to add 21 miles to our distance. I do not think, however, it would be wise to break our standard of grades for the sake of 21 miles of saving in distance, for I am certain that the saving in operation will very much more than compensate for the increased cost of construction.

CONCLUSION.

I may be allowed to remark that the results we have obtained to date justify us in stating positively that a first-class line of railway has been obtained extending from the Quebec boundary at Lake Baker near Edmundston, via Lake Pohenegamook, Lake St. Anne, St. Perpetue, St. Pascal, St. Philemon, Notre Dame, St. Damien, and the Etchemin river to the Quebec bridge and from the Quebec bridge westerly via the Batiscan river, La Tuque and St. Maurice river to Waymontachene, a distance of 423 miles. In no case will the grades opposed to eastbound traffic exceed 4-10, or 21·12 feet to the mile, and in a very few cases will the maximum gradient of 6-10, or 31·6 feet to the mile, be required opposed to westbound traffic. The maximum curvature of 6 degrees will only be called into requisition in a few places. The line

from one end to the other passes through a country which, where not capable of being developed into good agricultural districts will supply a good timber traffic to the railway, and though it cannot be expected that the cost of a line of such easy grades and curvature will be very moderate, I am firmly of the opinion that the average cost will not exceed by very much the sum of $30,000 per mile.

I attach to this report for your information a table of estimated distances, miles of line explored, miles of preliminary lines run and abandoned.

I also forward you, under separate cover, maps, on a scale of one mile to the inch, on which the different sections are noted, and the lines run and to be run are shown, the former in continuous lines and the latter in dotted lines.

In accordance with instructions received from you, I will not commence the location until the snow disappears, and I will keep my parties at work after they have finished the preliminary lines, revising them wherever I think such revision will lead to good results.

A. E. DOUCET,
District Engineer.

TABLE OF ESTIMATED DISTANCES AND MILEAGE.

Preliminary lines.

Party.	From.	To.	Engineer in charge.	Estimated distance.	Explored.	Run.	Abandoned.
				Miles.	Miles.	Miles.	Miles.
1A	Quebec Boundary.	St. Alexandre Road.	A. F. Macallum	52·0	19·0	68·5	14·2
1	St. Alexandre Road	St. Philip Road	E. H. Pierce	23·5	32·0	45·0	32·0
2	St. Philip Road	St. Marcel	P. C. Talbot	40·5	60·0	31·0	16·5
3	St. Marcel	St. Philemon	C. Garnet	34·0	19·3	25·0	15·5
4	St. Philemon	St. Jean Chrysostôme	C. A. d'Abbadie	60·0	28·5	63·9	18·5
..	St. Jean Chrysostôme	Boundary, Co. Portneuf.	E. A. Hoare	16·0			
5	Boundary, Co. Portneuf.	Batiscan River	F. A. Hibbard.	60·0	29·6	59·9	22·2
8	Batiscan River	La Tuque	R. E. Hunter	56·0	163·2	68·8	28·8
9	La Tuque	Waymontachene	B. Bourgeois	81·0	148·0	81·6	
	Total distance Quebec boundary, Lake Baker to Waymontachene.			423·0	499·6	443·7	147·7
6	Batiscan River	Lake Clear.	P. E. Mercier	78·0	165·5	37·8	14·2
7	St. Maurice River.	"	S. Lepage (disbanded)			11·0	11·0
10	Joliette	"	P. du Tremblay "	112·0	12·0	48·0	
	Totals				677·1	540·5	172·9

OTTAWA, March 28, 1905.

HUGH D. LUMSDEN, Esq.
Chief Engineer, Transcontinental Railway.

SIR,—In answer to your request to know how much saving in distance there would be in my district between the Quebec bridge and Lake Baker on the boundary between the provinces of Quebec and New Brunswick were we to use maximum grades of one per cent opposed to both east and west bound traffic, I attach herewith a table showing such saving.

A. E. DOUCET,
District Engineer.

Distances using present grades.	Points where distances may be saved.	Distances if 1 per cent grade used.
Miles.		Miles.
31·0	Lake Baker to Lake Pohenegamook	29·0
18·3	Loop at Lake Pohenegamook	11·0
9·5	River Noir	6·5
7·5	Summit at Government Road	7·0
24·0	Lakes Anne to St. Marcel	21·5
20·5	Lake Boilard to St. Philemon	15·0
18·5	St. Philemon to St. Damien	12·5
32·5	St. Damien to Quebec Central	17·5
16·5	Quebec Central to St. Chrysostôme	15·0
178·3		135·0
	Saving in distance	43·3

QUEBEC BRIDGE AND TERMINAL SECTION.

Under Mr. E. A. Hoare, comprising the main line of this railway, from the Intercolonial Railway main line near St. Jean Chrysostome to the south end of the Quebec Bridge and Railway Company's yard south of the St. Lawrence river, and from the north end of the bridge to the county line between Quebec and Portneuf. Also the proposed branches and terminals for Quebec city.

The main line distances were as follows.—

Line 1 with viaduct over Cape Rouge River.

	Miles.
Intercolonial Railway to B. & R. Company yard	5·33
B. & R. Company bridge and line	2·40
Bridge to County line	7·60
Total	15·30

Grade 0·4 each way.

Line 2, avoiding viaduct—

	Miles.
Intercolonial Railway to B. & R. Company yard	5·33
B. & R. Company bridge and line	2·40
Bridge to County line	13·14
Total	20·87

Grade 0·4 eastbound—0·6 westbound.

City approaches, bridge to Champlain market, 6·40 miles.
Grades adverse to westbound traffic about 53 feet to the mile.
Total distance County line to Champlain market via line 1·14 miles.
Branching off line 2, avoiding viaduct to Louise basin 6·40 miles.
Maximum grade 0·4.
Total distance County line to Louise basin via line 2, 12·75.
Maximum grade west-bound 0·6.
Total length of location and preliminary survey lines run in this section, 85 miles.

I requested Mr. M. J. Butler, assistant chief engineer, who had recently been over considerable portions of districts 'A' and 'B,' to make a comparative report on the distances by the Intercolonial Railway from St. Jean Chrysostome to Moncton, and

by our preliminary line; what the probable distance would be on final location between these points by the Transcontinental Railway line, and what difference would be made in this distance, supposing we used grades of 1 per cent in each direction; and to compare the operating values of the several lines on the basis of 10 freight trains per day each way; and what the difference in the capital account would be.

This report I beg to attach:—

Mr. HUGH D. LUMSDEN,
Chief Engineer, Ottawa, Canada.

SIR,—In reply to your inquiry of the 20th inst., asking me to report on:—

'1st. The length of the Intercolonial Railway with its one per cent grades in both directions from Moncton to St. Chrysostome where it intersects the line of the survey of the Transcontinental Railway.

'2nd. The length of the preliminary lines as run by districts 'A' and 'B' of the Transcontinental Railway, with balance grades of 4-10ths of 1 per cent (21 1-10 ft. per mile) rising eastwardly, and 6-10ths of 1 per cent (31 68-100 ft. per mile) rising westwardly, between Moncton and St. Chrysostome.

'3rd. The approximate shortening of the preliminary line, likely to be secured by the final location, preserving the gradients which have been secured.

'4th. The approximate shortening of the preliminary line likely to be secured, providing the grades were to be increased to 1 per cent.

'5th. To compare the operating values of the several lines on the basis of ten daily freight trains each way, on the Intercolonial Railway.

'6th. To capitalize the yearly cost, so determined on a basis of money at four per cent per annum.'

With reference thereto, I beg to say:—

1st. The distance from Moncton to St. Chrysostome, by way of the Intercolonial Railway is 493·5 miles.

2nd. The distance from Moncton to St. Chrysostome via the preliminary survey lines as run for the Transcontinental Railway, is 504 miles.

3rd. The estimated shortening of the preliminary line that will be secured by the final location is 18 miles, making the distance from Moncton to St. Chrysostome by way of the Transcontinental line, 486 miles. In arriving at this estimated shortening, I conferred with Mr. Guy C. Dunn, district engineer of District 'A,' and Mr. A. E. Doucet, district engineer of District 'B,' and it is from their estimates that the above distances are fixed. My personal knowledge of the field work and plans, based upon a recent examination of the line through New Brunswick and a portion of Quebec, would lead me to expect a still greater shortening of these lines in the final location. Hence, I have taken the distance at 486 miles for all comparisons as the length of the Transcontinental Railway from Moncton to St. Chrysostome.

4th. The estimated shortening from the preliminary survey lines, using 1 per cent grades both ways, is 100·3 miles, making the distance from Moncton to St. Chrysostome, by such 1 per cent both ways, grade, 403·7 miles. This estimated distance is contained in supplementary reports made by Mr. Guy C. Dunn, district engineer of District 'A,' and Mr. A. E. Doucet, district engineer of District 'B,' which are attached hereto.

SIZE OF LOCOMOTIVE.

5th. For the purpose of the calculation, I have taken the Intercolonial Railway locomotive No. 310, a simple consolidation, recently built by the Canadian Locomotive Company at Kingston, Ont., and which, I understand, is now in use on the Intercolonial Railway, the principal dimensions of which are as follows: Diameter of cylinder, 21 inches; length of stroke, 28 inches; height of driving wheels, 56 inches; weight of driving wheels, 150,000 pounds; weight of engine in working order, 165,000 pounds; weight of tender, 120,000 pounds; total weight of engine and tender, 285,000 pounds; or 142·5 tons. The weight of the van or caboose is 14·5 tons.

I assume that thirty ton capacity cars, which weigh when loaded, 46·15 tons, will constitute the train. The several trains which the above locomotive can haul at a speed of 15 miles per hour on the several grades below are as follows:—

Intercolonial Railway 1 per cent grades, 22 cars, equal to 660 tons net pay load.

Transcontinental Railway east-bound 4-10ths of 1 per cent grade, 42 cars, giving 1,260 tons net pay load.

Transcontinental Railway west-bound, 6-10ths of 1 per cent grade, 33 cars, giving 990 tons net pay load.

Transcontinental Railway westbound 6-10ths of one per cent grade, 33 cars, giving 990 tons net pay load.

The Intercolonial Railway, 10 daily freight trains each way, will haul in a year of 313 working days (length of line 493·5 miles), net pay tons 660 x 2, trains 2 x 10 x 313 days, = 4,131,600 pay tons; and to haul this number of trains will make 493·5 x 2 miles, 2 x 10 trains, 313 days, 3,089,310 train miles per year.

The cost per train mile on the Intercolonial Railway for the year 1903, as given in the report of the Department of Railways and Canals is 97·65 cents, which cost will be used for all comparisons. Hence 3,089,310 train miles x 97·65 cents = $3,016,711.21, which gives the annual cost of operating the ten daily trains on the Intercolonial Railway.

The Transcontinental Railway low grade line will handle the same tonnage, with 7 trains east-bound and 5 west-bound, although they will not be quite loaded to the full limit, the ratio of east-bound to west-bound traffic is taken at about 6 to 4. (Length of line 486 miles). Hence we get 486 miles x 12 trains x 313 days = 1,825,415 train miles per year, which moneyed out at the same price per train mile of 97.65 cents equal $1,782,518.72, which gives the annual cost of operating the twelve trains on the Transcontinental Railway.

The annual operating cost of the Intercolonial Railway being....	$3,016,711 21
The annual operating cost of the Transcontinental Railway being....	1,782,518 72
Leaves a net annual savings in favour of the Transcontinental Railway of..	$ 1,234,192 49
Which sum capitalized at 4 per cent per annum=	$30,854,812 25

And this amount is the increased value of the Transcontinental low grade line over and above the existing Intercolonial Railway, on the basis of ten daily trains each way over the Intercolonial Railway.

With increased business the difference will be much greater.

For instance, on the basis of 10 fully loaded trains each way per day on the Transcontinental, we get 486 length line x 10 x 2 trains x 313 days=3,042,360 train miles, which will cost per year at 97·65 cent, $2,970,864.54, and will transport 7,042,500 net pay tons.

To do this business on the Intercolonial Railway will require 34 daily trains, and we get 493·5 miles x 34 trains x 313 days=5,251,857 train miles, which will cost per year at 97·65 cents, $5,128,409.06.

The annual net savings in favour of the Transcontinental Railway on this basis being $2,157,544.52, which sum capitalized at 4 per cent per annum, gives $53,938,613, and this amount is the increased value of the Transcontinental low grade line over and above the existing Intercolonial Railway, on the basis of ten daily trains each way on the Transcontinental Railway.

The next comparison required is, between the proposed one per cent grade on the Transcontinental Railway, and other lines, the train loads to be the same as the Intercolonial Railway, as the grades are the same, the cost being affected by the shorter mileage.

Length of line from Moncton to St. Chrysostome, 403·7 miles; ten daily trains each way per day for 313 working days; 403·7 miles x 10 x 2 trains x 313 days = 2,527,162 train miles per year.

Tonnage hauled, same as on Intercolonial, viz., 4,131,600 pay tons; 2,527,162 train miles at 97·65 $2,467,773.69.

As the Intercolonial cost for the same service is $3,016,711.21, the net annual savings by the proposed 1 per cent Transcontinental would be $548,937.52, which sum, capitalized at 4 per cent = $13,723,438; and this amount is the increased value of the suggested 1 per cent Transcontinental line over the Intercolonial Railway, on the basis of ten daily trains over each road each way.

The comparison between the two proposed grades on the Transcontinental Railway works out as follows:—

On the basis of ten daily trains each way per day, on the 1 per cent grade line—

1 per cent grade line train mileage cost.....	$2,467,773 69
Transcontinental low grade line train mileage cost, doing same business....	1,782,518 72
Net annual savings in operation....	$ 685,254 97
Which capitalized at 4 per cent per annum = ...	17,131,374 75

And this amount is the increased value of the low grade line over the 1 per cent line.

In all the above calculations no account has been taken of reduced operating cost for passenger trains.

It is obvious that substantial savings will result from the use of lighter engines to haul the same passenger train. Less fuel, oil, &c., will be required, less wear and tear to track and bridges through lighter engines, better time and more uniform rates of speed may be maintained.

In conclusion, the cost per ton on the several lines, based upon the above figures are as follows:—

	Cents.
Intercolonial Railway, Moncton to St. Chrysostome per ton	73
Transcontinental Railway, 1 per cent grade, Moncton to St. Chrysostome, per ton..	59 7-10
Transcontinental Railway, 0·4 and 0·6 grade, Moncton to St. Chrysostome, per ton..	43

All of which is respectfully submitted.

M. J. BUTLER,
Assistant Chief Engineer.

DISTRICT 'C.'

CHARACTER OF COUNTRY.

The country through which the line in this district will pass is entirely uninhabited save by several Hudson's Bay or fur traders' posts and a few Indians, and unsurveyed with the exception of a few explorations, geological and others, along the principal rivers, and these generally at right angles to the direction of the proposed line. No reliable information is obtainable as to the country between the streams. As far as reports heretofore received by us would indicate, this country is dotted with numerous lakes, the land being more or less timbered with spruce, cypress, birch, poplar and small tamarac and cedar.

ORGANIZATION.

Eight parties were organized and sent out in this district in October, four going out by way of Maniwaki, P.Q., and four others by way of Kippawa, P.Q. Owing to the lateness of the season, these parties took considerable time in reaching their destination, caused by the low state of the water in the rivers, the early forming of ice and difficulty in transporting considerable quantities of provisions beyond the regular transportation routes.

WORK DONE.

They have now been at work for some time, but in many cases have had to abandon miles of line owing to their meeting with numerous lakes and stretches of country where it was impracticable to obtain the grades required.

From the latest reports they are now making fair progress, but it will be some time before it can be decided whether the north or south line will prove the most advantageous.

CACHÉS.

Cachés with provisions for all the necessary parties for the next ten months have been provided at the forks of the Gatineau, and at the north end of Grand Lake Victoria. As soon as the ice moves out of the rivers and lakes supplies will be distributed east, west and north from these cachés for the use of the various parties.

The reports so far received would indicate that the north line will probably be found the most advantageous, both as to cost of construction and nature of the country passed through in respect to its suitability for settlement.

DISTRICT 'D.'

COUNTRY.

The nature of the country and of the timber in this district is in many respects similar to that of District 'C,' and there are no settlements in the vicinity of the proposed line other than Hudson's Bay and fur-trading posts on Lake Abitibi, close to which lake the lines will run.

Two parties are now at work in this district, one on the line passing to the south and one on the line passing to the north of Lake Abitibi. From reports the party working on the south line will find a rough, broken country for at least 30 miles westward of their starting point, which point is about a mile and a half from the upper end of Agotawekami lake. So far, from this point eastward that party has had no trouble.

ORGANIZATION.

Three more parties are just being sent out, one going on the north line from near the North-west bay of Lake Abitibi and running westward; a second party going down the Abitibi river to the vicinity of this proposed northern line and running easterly for say six miles and then westerly; the third party going in to near the north-east corner of the township of Beatty and running easterly to Ghost river, and then returning to their starting point and running westerly beyond Frederichouse river. These parties are all expected to be at work before the end of March.

DISTRICT 'E.'

The surveys in this district have all heretofore been conducted under Mr. J. R. Stephens the engineer for the Grand Trunk Pacific Railway, and a line run across the

entire distance; but from a point say 110 miles easterly from the north end of Nipigon lake this line inclined too much to the south, especially after crossing the Missanabi river, near Albany rapids, at which point it turned south-easterly headed for North bay. At the last mentioned point near Albany rapids the line run would be about 18 or 20 miles south of a direct line passing to the north of Lake Abitibi, as now proposed.

I am now arranging for parties who have been working for the Grand Trunk Pacific during the winter in that vicinity to be put on to explore this direct line through to connect with parties which have just been sent out in District 'D,' for a similar purpose. The surveys so far made in this district go to show that the country is rough and broken in places, with one or two expensive river crossings, especially that of the Pequtchewan river, but as the new proposed line is some distance north of the line as run, and I have been informed that a much better crossing can be found to the north of said line, it is probable that this crossing can be much reduced in cost. The line run in this district passes through what may be found to be fair agricultural lands of considerable extent, with large area of brule, but where not burnt over the timber is generally small spruce, cedar and tamarac, the latter generally dead, with occasional blocks of heavier timber, suitable for ties, &c.

DISTRICT 'F.'

The surveys in this district up to January last were conducted by the Grand Trunk Pacific engineers, who in November commenced locating a line which showed heavy work in places. From the information furnished by them it was my opinion that there was not sufficient exploration through the country to warrant the continuance of location until such time as I was sure the line they had run was the best the country afforded. Accordingly in January last I sent out one preliminary and five exploratory survey parties under Major A. E. Hodgins, district engineer, to explore and examine other sections of the country than those shown to have been explored by the Grand Trunk Pacific parties.

The following is Major Hodgins' report, showing fully the work that has been done in that district:—

WINNIPEG, MAN., March 18, 1905.

HUGH D. LUMSDEN, Esq.,
Chief Engineer, Transcontinental Railway Commission,
Ottawa, Ont.

SIR,—I have the honour to submit the following report on surveys and explorations in my district, in accordance with instructions received in your letter dated March 11, 1905.

ORGANIZATION.

The organization of one preliminary and five exploratory parties was completed by January 12, and I did not expect to have to report before their return in the spring, and had received their reports and sketches and the data they are to collect. These reports, I hope, will be sent in early in April. I was considerably handicapped at first by not being able to visit the Grand Trunk Pacific engineers' camps in this district, and for lack of plans and profiles of the work they had done, to show the engineers in charge of parties before going out. These difficulties have been overcome, and I now have copies of most of the plans and profiles made by the Grand Trunk Pacific engineers during the past two years. Another difficulty to contend with is that there are no accurate maps of this district; only a few of the navigable streams have been surveyed, and the rest of the country shown blank on maps is full of lakes, streams and other topographical features.

I show on the accompanying map a direct line from Winnipeg to a point on the north shore of Lake Nipigon, and the Grand Trunk Pacific survey is shown to the north

of this line. It should be noted that this survey runs in many places along the southern bank of the English river. Cut-offs have been run in several places to knock out bends, but no other country has been explored for a straighter line south of this survey until January of this year. Six parties were placed south of this line of country, with instructions to explore for a more direct route, and possibly a less costly one, by keeping away from the shores of the large waterways.

Parties 1 and 2.

Parties Nos. 1 and 2 were not organized.

Parties 3 and 4.

Parties Nos. 3 and 4 were sent into the north end of Sturgeon lake, via Ignace, to explore east and west from that point, with the hope of making a considerable saving of distance on the Grand Trunk Pacific surveyed route, which bore to the north from the vicinity of Frenchman's Head near the junction of the Thunder Bay branch. These parties are still in the field, and I have not had reports for February, but from information I have been able to gather from other sources, I am of the opinion that their reports will be favourable, and possibly two miles may be saved in distance.

Party 5.

Party No. 5 was sent from Dinorwic to the northern extremity of Lake Minnetaki, to examine all the possible crossings of the English river from Abram Chute north to Lac Seul, and then to proceed west along the eastern arm of Lost Lake. Six crossings have been surveyed and about twelve miles of country explored, and should the explorations and trial line, when run, be successful, I hope to be able to show that about 8 miles of the Grand Trunk Pacific branch to Thunder Bay will be unnecessary to build (see sketch). This saving I am unable at present to guarantee until an instrumental survey has been run. The explorations so far have shown no unsurmountable obstacles.

Party 6.

Party No. 6 went north of Dryden and have been exploring west. They have covered 40 miles so far, and will continue until Canon river is reached, when I hope to have a detailed report. This party has reported the country will warrant a trial line being run.

Party 7.

Party No. 7 went north of Rat Portage on the Winnipeg river looking for a possible crossing south of White Dog Crossing. At the Dalles, about 12 miles north of Rat Portage, there is a possible crossing, and another four miles further north. The latter will be wide, but could be used if a shorter line is obtainable from that point to a junction with party No. 6 on Canon river. A break in the country has been reported at this wide crossing called the Black river, and this is now being explored. The engineer reports a trial line should be run and does not expect there will be any difficulty to get a good line from Winnipeg river to Canon river.

These explorations were interrupted when the transfer of the Grand Trunk Pacific parties was made.

I recalled Mr. Macfarlane to take over Mr. Heaman's party, but on finding that Mr. Heaman was willing to continue on for a short time longer, I was enabled to let Mr. Macfarlane continue his work, and also when returning to the point at which he had left off, to go over the ground proposed by the Rat Portage delegation to enter that town. This party has covered about 36 miles and examined two river crossings.

Party 8.

Party No. 8 was started from Whitemouth and ran 21 miles of preliminary line through the muskeg, and established by soundings that the muskegs were shallower than further north on the Grand Trunk Pacific survey at the time of the transfer of

the Grand Trunk Pacific surveys. I moved this party to the Manitoba boundary to run a short exploration to Cross lake to meet Mr. Heaman and his party, whom I had put on a new line to try and throw out three tunnels.

Grand Trunk Pacific Party.

Another Grand Trunk Pacific party, formerly under Mr. Ord, was working in the neighbourhood of Winnipeg, locating. As the entry into Winnipeg has not been determined and my explorations east not finished, I deemed it advisable to stop their work, and sent the transitman with a few men to ascertain the position of Red Rock lake, and the course of Mud river west of Cross lake; the engineer in charge, Mr. Darey, and his topographer going into my office to finish their notes and plans. This work now being finished, I have instructed Mr. Darey that his party will be disbanded. This party has done 37·2 miles preliminary and locating on the prairie.

Mr. Heaman's Party.

I found Mr. Heaman's party was working on location east of Sandy lake, near Lake Jim, where he was encountering considerable difficulty in following the preliminary line laid down. I therefore stopped his work on location and brought him back to run a line which I thought might throw out three tunnels and reduce the crossings of the Winnipeg river and Swan lake. This line can be developed should the Grand Trunk Pacific survey eventually be adopted.

I enclose Mr. Heaman's report and plan.

Mr. Heaman's party having been out for the past sixteen months, do not wish to go back to exploration work, so I deemed it advisable to disband them.

MR. MACRONE'S GRAND TRUNK PACIFIC PARTY

With reference to Mr. Macrone's Grand Trunk Pacific party, I was on my way to take over this party and the cachés in the neighbourhood, when I received a letter from Mr. Knowlton informing me that he had ordered Mr. Macrone to report to him at once and that his entire staff were leaving. You have a copy of the letter. I considered it wise not interfere with this, and wrote Mr. Macrone to turn his plans and camp outfit over to one of my staff, whom I sent up to the head of Sturgeon lake. I also asked Mr. Bailey to assist Mr. Macrone in reaching Ignace by the transport teams that were returning empty. I also asked Mr. Macrone to send me a report on his work as soon as he conveniently could.

ROUTE.

I am of the opinion from what information I have received so far from engineers on exploration that there is a possible route as sketched out on the accompanying plan.

A true direct line is shown on the sketch, also the position of the Grand Trunk Pacific survey.

Starting from the eastern limit of my district, a saving of considerable distance may be obtained when an instrumental survey is made between the eastern limit and the junction of the Thunder bay branch.

By running south of the junction of the Thunder bay branch and the main line near Frenchman's Head, I may, by crossing at the Sioux Outlook or Pelican Falls, save the Grand Trunk Pacific from building the last eight miles of their branch, provided a suitable site for a yard be found. North of Dryden I touch what is known as the only farming land between the Manitoba boundary and Lake Nipigon.

Crossing the Winnipeg river I expect to meet with some difficulty, but hope to save enough in distance to more than compensate for large quantities. There are three tunnels on the Grand Trunk Pacific survey north of this point. (See Heaman's plan.)

I have yet to explore west from the Winnipeg river to the Manitoba boundary, but am sending an engineer to that country shortly.

The prairie and muskeg country will be much the same, the muskegs perhaps being shallower, and my line across the surveyed farms near Winnipeg will run some distance along a township line. This will please the farmers, by not cutting their land into irregular portions.

PRELIMINARY SURVEY PARTIES.

I propose organizing preliminary survey parties in April, and placing them on the line I have described, unless the final reports of the engineers show it to be impossible.

TIMBER.

I anticipate there will be enough tie timber to supply the whole of my district and the Thunder bay branch.

There will be very little timber of piles and dimension timber.

DESCRIPTION OF COUNTRY.

The country consists principally of rocky knolls surrounded by series of lakes; occasionally the line crosses patches of sand and muskeg.

On the rocky ridges, scrub, spruce and jack-pine are growing; occasionally jack-pine reaching the dimension of 12 inches.

Muskegs, usually timbered with small spruce four to eight inches diameter, sometimes have occasional tamarac trees from eight to fourteen inches.

There will not be much borrow for large fills except rock.

A. E. HODGINS,
District Engineer.

WINNIPEG, March 15, 1905.

A E. HODGINS, ESQ.,
District Engineer Transcontinental Railway Survey,
Winnipeg, Man.

SIR,—As requested by you, I submit the following report of work done by party in my charge during months of February and March.

The party was engaged in location on section 8 from the latter part of November until the latter part of February. On the 18th of the last month I received your communication from White Dog and had the pleasure of meeting you there and talking over the situation.

As I explained to you at White Dog, I had been working from mile 10 to mile 20 since the 20th January, and had found it necessary to not only run out the projected location, but to also project and run a second line in which I took advantage of all the information obtained in running the first. In most cases the great difference between the depths of the muskegs, as shown on preliminary and as found on sounding on the located line was the factor which made the second location necessary. In quite a number of cases muskegs shown to be 5 to 6 feet deep proved so deep that they could not be sounded with a 36 foot rod.

Mile 10 to mile 20, the plans and profiles of which you have now received, has had the first line run over it, and the second line has been brought up to mile 18. Besides this location, I ran some four miles of preliminary, this being rendered necessary by the great distance it was sometimes necessary to throw the second location from the first.

After my verbal report to you in White Dog I brought the party west as far as Sandy lake, according to your orders, and after traversing a part of the Winnipeg river, ran an exploration line west from the Winnipeg to a point four miles west of the Manitoba boundary. This line, besides being more direct as you expected, also

presented the possibility of cutting out three tunnels and two long crossings of the Winnipeg river.

From the map and profile of this exploration which I have sent you, you will see that the small maps on which you based your opinion of the proposed line are inaccurate, both at the Winnipeg river and Lake Jadel (or Split Rock), to the Scott river. I find that this lake instead of draining into the Scott river really flows into the Winnipeg four to five miles north of the Scott. This latter is known in the country as the Waterfall river.

The only points on the Winnipeg river which are at all possible for crossings are those marked B and C. The latter by utilizing the island shown would give a total crossing of some nine hundred feet. From the few soundings I was able to get I judged that with the exception of fifty to one hundred feet east of the island the depth of water would not be greater than thirty feet and most of it between ten and twenty. The fifty to one hundred feet mentioned would possibly reach a depth of forty feet. Current is about four miles per hour.

At the B crossing I was unable to get soundings owing to the shaky character of the ice, but from reports and the strength of the current I should judge the depth would not be very great. From C to A a good line giving moderate work can be obtained joining at A with a preliminary location line on the Grand Trunk Pacific surveys. This latter line, although giving some heavy work before it joins with the located line north of Sandy lake, would be without a nine hundred foot tunnel now proposed in the location.

The country in a direct line between C and the southern extremity of Swan lake, is altogether too high to cross with the gradients allowed, and the only alternative is to follow the shores of the bay of the Winnipeg river to D, and thence across to Swan lake, following more or less closely the line marked portage. The transit of exploration line runs in a more direct line to the southerly extremity of Swan lake, but reaches too great an elevation to be feasible.

From the end of Swan lake to the Waterfall river the transit line follows the valleys of two creeks flowing respectively into Swan lake and the Waterfall river, but the summit is both too high and too long to be practicable. This route is, however, the lowest through the country in a direct line and the only alternative is again to follow the shores of Swan lake and the Winnipeg river to the Waterfall river from F to G. These shores are very abrupt and rocky, especially from the Waterfall river along the bay of the Winnipeg river, and it is impossible to say without further survey whether the work on such a line would be within reasonable limits or not.

The crossing of Swan lake, although long, would not be of great depth, and would be on a clay bottom.

From the Waterfall river to Jadel (or Split Rock lake) the country is clay land covered largely with poplar timber. The line crosses some muskeg, but it is not of much depth.

South of Lake Jadel on the Manitoba boundary the country is very rough, the rock ridges reaching an elevation seventy-five to one hundred feet above the lake. To the north of this lake I found one of the Grand Trunk Pacific location lines, and if you deem a preliminary advisable I think the best line will be obtained by crossing the Waterfall river, some little distance closer to its mouth, and running more northerly to the east end of Lake Jadel, and joining this line at some point along its northerly shores.

J. A. HEAMAN,
Assistant Engineer.

The accompanying map shows the approximate routes of lines as now being run through the entire distance between Moncton and Winnipeg.

I beg to attach a copy of the general specifications as they have been approved by Mr. H. A. Woods, acting for the Grand Trunk Railway, and Mr. Collingwood Schreiber, Chief Engineer of the Department of Government Railways and Canals.

In conclusion, I regret to report that on November 28, 1904, Mr. W. T. Leamy, who had charge of the transport service for parties Nos. 1 and 2, District 'D,' was missed by his men, and though diligent search was made several days for him nothing was found, except on the evening of the day he disappeared his tracks on the ice were followed for several miles from the camp, which was near the easterly end of Lake Opasatica, and there is no reasonable hope of his being found alive. His loss was much to be regretted, as from information received he had been doing good work.

HUGH D. LUMSDEN,
Chief Engineer.

SESSIONAL PAPER No. 62c

SECRETARY'S REPORT.

OTTAWA, March 31, 1905.

F. B. WADE, Esq.,
Chairman, the Transcontinental Railway Commission,
Ottawa.

SIR,—As instructed, I beg to report on the organization of our different departments, other than the engineering department, and on the working of each.

TRANSPORT DEPARTMENT.

In the surveying and location of the line of the Transcontinental Railway the work has to be performed over large sections of country removed from the centres of supply, and devoid of transportation facilities. Provision had therefore to be made for the transportation of supplies for the maintenance of the parties in the field; and the organization of an efficient transport service will be readily recognized as one of the most important duties which devolved upon the commission in connection with its work of organization. Not only had convenient and practicable routes to be opened up, involving in many cases the cutting of roads through the bush, cachés (or store shacks) established at convenient points, and placed in charge of storekeepers, and supplies delivered to the different parties as required, but, transportmen and storemen had to be thoroughly instructed in the manner in which the supplies were required to be handled and as to the reports to be made, so that the commission's records would be complete, and in such form as to furnish the fullest information as to the disposition of all supplies.

I give below a copy of the instructions given to storekeepers and transportmen, which will best explain the nature of their duties.

INSTRUCTIONS FOR STOREKEEPERS.

Storekeepers will be provided with a book in which they shall keep a true and correct record of all supplies received, and another book in which they shall keep a true and correct record of all supplies delivered to contractors or others authorized to receive them for transport.

A monthly statement of supplies received and delivered, together with an inventory of the stock on hand, must be sent to the transport officer for their district on the first of every month.

Receipts in duplicate for all supplies delivered from their stores must be taken by storekeepers; the originals should accompany the monthly statement above referred to, and the duplicate should be kept on file in the office of the storekeeper.

Forms of receipt will be furnished to storekeepers, who must at all times keep a supply on hand.

Storekeepers will be under the jurisdiction of, and will report to, the transport officer for their district, who will report to the Commission on all matters affecting the stores and the forwarding of supplies.

Should a contract exist for the transport of supplies from any storehouse to any caché or engineering camp or other storehouse, the storekeeper must keep himself informed at all times as to the progress of the contract, and the delivery of the goods to their destination by the contractor, and must urge the contractor to use all possible diligence in the delivery of such goods as may be unloaded en route to the point of destination.

Storekeepers receiving goods transported from another storehouse will carefully check the goods received and furnish to the contractor or transport officer a receipt in duplicate for the goods delivered on the form provided him for that purpose, a duplicate of which must be handed by the contractor or transport officer to the storekeeper at the forwarding point, and the original retained by the contractor or transport officer.

Storekeepers at forwarding points, in addition to taking from the transport officer or contractor a receipt in duplicate for material delivered to him for transport, shall hand him an advice note in duplicate, which shall enumerate in detail the material delivered him for transport. The original of this advice note must be handed to the receiving storekeeper and the duplicate retained by the transport officer or contractor. Forms of advice note will be furnished to storekeepers, who must at all times keep a supply on hand.

Should an accident occur and goods be lost in transit, or the failure of the contractor to fulfil his contract appear imminent, a special report of this should be made promptly to the transport officer for the district.

Storekeepers who are required to carry a stock of supplies for the requirements of the engineering parties shall deliver supplies only on presentation of a requisition in duplicate, signed by the engineer in charge of the party. The originals of such requisitions shall be attached to the monthly statements of the supplies delivered, and sent to the transport officer, and the duplicates shall be kept on file by storekeepers.

Storekeepers required to keep a stock of supplies shall at all times keep a sufficient supply on hand, and, when necessary, shall requisition on the transport officer for their district for further supplies.

Storekeepers will report promptly to the transport officer for their district any shortage or over-shipment, the receipt of supplies of a poor quality or in a defective condition, giving the fullest particulars in each case.

All employees guilty of neglect of duty, insubordination, or drinking while on duty will be dismissed.

Approved : By order.

F. B. WADE, Chairman, P. E. RYAN, Secretary.

The Commissioners of the Transcontinental Railway.

OTTAWA, December 27, 1904.

INSTRUCTIONS FOR TRANSPORT OFFICERS.

Transport officers at and west of Maniwaki will be supplied with sufficient funds to take up and pay all discharge cheques on presentation not exceeding $40 in amount, having the same properly receipted, as is required, in triplicate, and, in the case of discharge cheques exceeding $40 in amount, to pay such amount as may be required by the persons holding the cheques to enable them to reach a point where the cheques may be cashed, but, in such cases, the advance made by the transport officer must not exceed $40 on each such cheque presented, and, when such advances are made, the transport officer shall require every person prsenting a time-cheque to receipt the form in triplicate on the back thereof for the amount advanced, and, in addition to such receipt which shall be endorsed on the time cheque and be retained by the party receiving the advance, the transport officer shall take another receipt in triplicate for the amount advanced, which receipt in triplicate must be attached to his statement of disbursements.

Transport officers taking delivery of supplies at any railway station must carefully check the supplies with the advice note and must receipt only for supplies received. Any shortages should be at once reported to the station agent, and to A. L. Ogilvie, the commission's purchasing agent at Ottawa.

Invoices for supplies shipped to transport officers will be forwarded by the purchasing agent to the officer receiving the supplies for certification as to their receipt.

Transport officers will check supplies very carefully with the invoices, and, if any shortage is discovered, the purchasing agent should be promptly notified of such shortage. If the goods have been received invoices should be stamped in triplicate, 'I certify the above goods have been received,' and returned to the purchasing agent. Stamps for the proper certification of invoices will be forwarded to transport officers.

All possible diligence must be exercised in getting supplies to their destination, and, when any of the supplies are stored or cached between the railway station and the point of destination the transport officer must move same to destination without undue delay. Any losses must be promptly reported to the commission through the secretary.

Transport officers for each district are required to keep in close touch with the storekeeper in their respective districts, who are required to make to the transport officer for their district a monthly statement of the supplies received and delivered, together with an inventory of the stock on hand.

Transport officers will report to the commission through the secretary in all matters affecting the stores and forwarding of supplies. Storekeepers are expected to report to the transport officer for their district any short or over-shipments, and the receipt of supplies of poor quality or in a defective condition, giving the fullest particulars in each case, and transport officers on receipt of such report will promptly report same to the secretary of the commission.

Where storekeepers do not receive the goods directly from any railway the transport officer shall keep a true and correct record of all supplies received, and shall keep a similar record of all supplies delivered, and shall take a receipt in duplicate to cover the delivery of all supplies: the original shall be retained by the transport officer, and the duplicate shall accompany his report to the commission.

Employees guilty of neglect of duty, insubordination or drinking while on duty will be dismissed.

Approved :

F. B. WADE,
Chairman.

By order.

P. E. RYAN,
Secretary.

The Commissioners of the Transcontinental Railway.

OTTAWA, December 27, 1904.

With a view to the most careful supervision of transport matters, a department was recently established, and Mr. Cecil Doutre, of Montreal, was appointed transport clerk, at a salary of $125 per month. Mr. Doutre speaks, reads and writes French and English fluently. It is intended to place this department under the supervision of a chief transport officer, who will be responsible to the board for its efficient management.

The following is a list of transport officers and storekeepers employed by the commission, showing the salary of each:—

Transport Officers.	Location.	Salary.
W. L. McGiverin	Maniwaki, Que.	$100.00 per month.
C. F. Ross	Quebec, Que.	100.00 " "
R. H. Fraser	Moore Lake	125.00 " "
D. G. Stewart	New Liskeard	100.00 " "
G. H. Starnes	North Temiskaming	100.00 " "
R. C. Macdonald	Missinabi	100.00 " "
L. O. Bailey	Between North Bay and Winnipeg	150.00 " "

Storekeepers.	Location.	Salary.
L. J. Almon	Grand Lake Victoria	$40.00 per month.
Frank Braun	" " "	40.00 " "
J. J. Rickard	Maniwaki, Que	60.00 " "
F. J. Tighe	Forks of the Gatineau	40.00 " "
J. E. Lareau	Upper cache Gatineau	40.00 " "
R. C. Mayer, Assistant	" " "	40.00 " "
A. Ouellette	New Liskeard	70.00 " "
J. E. Dowling	North cache, Lake Abitibi	40.00 " "
R. P. Strickland	North Temiskaming	40.00 " "
G. E. Fordyce	At cache between Grassett Station and Lake Kabinakagami	40.00 " "
W. E. McIntyre	At cache between Grassett Station and Lake Kabinakagami	40.00 " "

On the Maniwaki route there are nine dog drivers and nine axemen employed at a salary of $40 per month; one foreman at $50; one at $60; and two cooks at $60 per month.

About 93 tons of supplies have been transported via this route.

On the Moore lake route there are ten packers at $1.50 per day, eight packers and boatmen at $2 per day, and two cooks at $55 per month.

Via the Moore lake and Kippewa routes to Grand Lake Victoria approximately 65 tons of supplies have been transported.

In District 'D' a contract has been awarded to Samuel McChesney, of New Liskeard, to transport 30 tons of supplies from the end of the steel of the T. and N. O. Railway, about 25 miles north of New Liskeard, to cachés to be erected, one at the south-west bay of Lake Abitibi, and one at the north-west bay of same lake; and to cut all roads necessary, such roads to be via the north-east corner of the township of Bowman, for the lump sum of $4,400. Any supplies in excess of 30 tons are to be transported at a price of $75 per ton. Transport officer D. G. Stewart is supervising the transport of these supplies. Approximately 25 tons of supplies have been transported via North Temiskaming, and 84 tons via New Liskeard.

From Grassett station on the Canadian Pacific Railway approximately 30 tons of supplies are being transported to what is known as caché No. 9, on the Grand Trunk Pacific survey just north of Lake Kabinakagami. A contract fo rthe transport of these supplies has been awarded to J. McN. Austin, of Chapleau, at the price of $7 per hundred pounds. A caché and storehouse is to be built at the north end of the above-mentioned lake under the terms of Mr. Austin's contract, for the sum of $150. These supplies are going in under the supervision of Transport Officer R. C. Macdonald.

In District 'E,' a contract has been entered into between the Commissioners and the Hudson's Bay Company to transport from 30 to 60 tons of supplies from Nipigon, on the Canadian Pacific Railway, to South Bay, on Lake Nipigon, and, on the opening of navigation, to transport these supplies to Wabinach, north-west of Lake Nipigon, and from there to the mouth of Mud river, on the north of Lake Nipigon, and to Amabika, on the north-east of Lake Nipigon, and to deliver same to the storehouses of the Commissioners in said places for the sum of $2.50 per hundred pounds. These supplies (approximately 30 tons) are going in under the supervision of Transport Officer L. O. Bailey.

In Districts 'A' and 'B' such transport service as is necessary is under the immediate supervision of the district engineers.

Since the above was dictated, Mr. R. F. Fraser has been appointed chief transport officer at a salary of $150 per month.

PURCHASING DEPARTMENT.

In view of the magnitude of the enterprise and the importance of removing any misconception which may exist in the public mind with regard to the discretionary

powers and freedom of action vested in the head of this department, a word explanatory of the scope of the department and its manner of working will probably be both opportune and instructive.

On first view it would seem that the conduct of such a large undertaking as the construction of a trunk line of railway 1,875 miles in length would involve enormous expenditures in the purchase of railway construction plant and the thousand and one articles required from time to time on the shortest possible notice, and that, therefore, the general purchasing agent should be a man of wide experience and proven ability in the purchasing of railway supplies, who should be assisted by a large and experienced staff. And this view would unquestionably be the correct one were all of this material to be purchased through the office of the general purchasing agent, as is sometimes done by special arrangement in the case of railways in operation having portions of their line rebuilt, or extensions or branch lines constructed.

In the case of the eastern division of the Transcontinental Railway, however, as the work will be done entirely by contract, as required by the Transcontinental Railway Act, all construction plant and contractors' supplies will necessarily be furnished on the scene of operations by the contractors whose tenders have been accepted.

The purchases which will be made by the purchasing agents will be confined to supplies and equipment for the engineering parties in the field, and for the transport service; and it is confidently believed that the present staff of the purchasing department, with but few additions, if any, will be able to cope successfully with the work. Mr. A. L. Ogilvie, the commission's general purchasing agent, has had considerable experience as a buyer, and his assistant, Mr. F. W. White, was for many years engaged in railway work with the Canadian Pacific Railway.

WORKING OF THE DEPARTMENT.

For supplies for engineering parties a requisition approved by the chief engineer must come before the board for approval before the material can be purchased, except in cases of emergency, when permission may be obtained by the district engineer by telegraph to purchase the goods, but in all cases a requisition must be sent in to cover the material purchased. After approval by the board requisitions are forwarded to the general purchasing agent. An official order in writing is issued by the general purchasing agent for each purchase, which contains proper shipping and other instructions. Invoices covering all such purchases must give reference to the requisition and order numbers on the face of the invoices. Invoices in triplicate covering material purchased are sent to the general purchasing agent, where the prices are checked and certified to as being fair and just. They are then sent, through the transport department, to the party receiving the goods, who checks the goods received with the invoices, which, if found correct, are certified by him: 'I certify the above goods have been received.' When the invoices have been properly certified they are sent to the accounting department, where the extensions and additions are checked, and vouchers prepared. They are then sent to the secretary of the board for his approval, and if they are found to be in order are passed on to the commission for approval for payment, after which cheques issue, and a voucher in triplicate for each cheque issued is sent to the person in whose favour the cheque is made, and returned to the commission. Thus, the commission is in a position to furnish the Department of Railways and Canals and the Auditor General each with a receipted voucher for every cheque issued, together with a copy of the account or accounts covered by each such receipted voucher.

The general purchasing agent reports to me that the purchases up to the end of February, 1905, amount to $139.020.14. This represents an expenditure covering a period of six months, showing an approximate expenditure of only $23,170 per month. These purchases are divided amongst the provinces as follows:—

Nova Scotia	$ 2,561 28
New Brunswick	10,069 04
Quebec	54,514 82
Ontario	55,475 00
Manitoba	16,400 00
Total	$139,020 14

In considering these purchases the fact should not be lost sight of that much of the supplies have not been used, but are stored in cachés, or are in transport for the future requirements of the engineering parties in the field. At the present time the staff of the purchasing department and the salary of each member thereof is as follows:—

Name.	Occupation.	Salary.
A. L. Ogilvie	General Purchasing Agent	$200.00 per month.
F. W. White	Assistant " "	100.00 " "
F. S. West	Local Purchasing Agent at Fredericton, N. B.	125.00 " "
H. G. Alton	Local Purchasing Agent at Winnipeg, Man.	100.00 " "
H. R. Landry	Stenographer	70.00 " "
G. O'Reilly	Porter	60.00 " "
J. D. Jutras	Clerk	70.00 " "
Miss A. Seed	Clerk and Stationery Storekeeper	25.00 " "

ACCOUNTING DEPARTMENT.

This department is now thoroughly organized, and is working well. The staff of the accounting department is as follows:—

Name.	Occupation.	Salary.
A. T. Gow	Chief Accountant	$150.00 per month.
R. M. J. McGill	Assistant Accountant	125.00 " "
J. C. Clement	Clerk	100.00 " "
W. R. Saults	"	75.00 " "
H. Charland	"	70.00 " "
R. H. Lang	"	60.00 " "
R. Lagimodiére	"	60.00 " "
A. Beaudry	Stenographer	70.00 " "

Accompanying this report are the following statements:—

(1) Statement of receipts, expenditures and liabilities to February 28, 1905.

(2) Statement of deposits to credit of receiver general on account of the National Transcontinental Railway.

(3) Statement showing expenditure under the different headings from September, 1904, to February 28, 1905.

(4) Statement of expenditure on account of the survey parties in the field, September, 1904 to February 28, 1905.

(5) Statement of property on hand February 28, 1905.

P. E. RYAN,
Secretary.

STATEMENT of receipts, expenditures and liabilities to February 28, 1905.

Receipts.

1904—	
September 26—Amount of letter of credit.....	$100,000 00
December 27— " "	100,000 00
1905—	
January 30—Amount of letter of credit.....	100,000 00
February 9—Amount collected from Public Works Department for use of rooms occupied by Georgian Bay Ship Canal in Corry Building and deposited to credit of the Receiver General.....	108 36
	$300,108 36

Expenditures.

Amount of expenditure as per attached statement.....	$323,846 77
Less various sums returned unexpended and deposited to credit of the Receiver General as per attached statement.....	859 91
	$322,986 86

Liabilities.

Salaries and wages.....	$40,444 14
Accounts for supplies, expenses, &c.....	40,305 52
	$80,749 66

A. T. GOW,
Accountant.

STATEMENT showing expenditure under the different headings from September, 1904, to February 28, 1905.

Headquarters Staff and General Accounts.

Salaries of Commissioners and staff	$22,722 09	
Travelling expenses, Commissioners and staff	4,148 84	
		$26,870 93
Salaries of engineers, headquarters	$ 8,313 35	
Expenses of " "	950 26	
		9,263 61
Rent, general offices	$ 4,250 00	
Office furniture and fixtures	7,971 30	
Telegraph and telephone	750 92	
Insurance	195 70	
Freight and express	638 37	
Sundry general office expenses and cleaning	300 22	
Postage	200 00	
Instruments	16,446 26	
Stationery	4,313 02	
Stock—Supplies not issued	3,856 76	
Draughting office supplies	1,905 78	
Engineers' field equipment stock	365 00	
Engineers' reference books and tables	283 65	
Audit of Grand Trunk Pacific survey accounts	802 10	
		42,279 08
		$ 78,413 62
Cost of survey parties, as per attached statement	245,433 15	
		$323,846 77

A. T. GOW,
Accountant.

STATEMENT of expenditure on account of Survey Parties in the field.

September, 1904, to February 28, 1905.

District 'A'—		
Salaries and wages	$37,057 58	
Camp outfits, provisions, &c.	21,893 67	
		$58,951 25
District 'B'—		
Salaries and wages	$37,859 35	
Camp outfit, provisions, &c.	26,857 70	
		64,717 05
Quebec Bridge and Approaches—		
Salaries and wages	$ 2,468 06	
Boarding expenses, &c.	966 00	
		3,434 06
District 'C'—		
Salaries and wages	$28,721 97	
Camp outfit, provisions, &c.	35,086 87	
		63,808 84
District 'D'—		
Salaries and wages	$ 6,477 20	
Camp outfit, provisions, &c.	10,737 48	
		17,214 68
District 'F'—		
Salaries and wages	$ 4,733 55	
Camp outfit, provisions, &c.	9,906 77	
		14,640 32
Transport Service—		
Salaries and wages	$ 7,298 32	
Expenses, freighting, &c.	15,368 63	
		22,666 95
		$245,433 15

A. T. GOW,
Accountant.

DEPOSITS to credit of Receiver General, on account of the National Transcontinental Railway.

1904—		
October 26—Unexpended balance of $500, R. Reid, for expenses in October, 1904		$160 00
November 7—Rebate on special train (see R. Reid, $500, October, 1904)		24 50
November 16—Rebate on duties (see Collector of Customs $642.25, and $352.50, October, 1904)		27 25
1905—		
January 4—Unexpended balance of cheque in favour of F. Dillon for $1,800, December 19, 1904		634 30
January 20—Rebate on ham, &c., from Bauld Bros. & Co.		13 86
		$859 91

A. T. GOW,
Accountant.

STATEMENT of property on hand February 28, 1905.

Office furniture and fixtures at Ottawa		$7,971 30
" "	at Fredericton	900 00
" "	at Quebec	600 00
" "	at Winnipeg	800 00
Stationery in store at Ottawa		2,838 75
Draughting office supplies at Ottawa		1,851 86
Camp outfit supplies at Ottawa		3,915 60
Survey instruments at Ottawa		4,694 26
Instruments with engineers in the field		11,752 00
Canoes and paddles, 23		1,025 80
Batteaux and oars, 4		168 00
Camp outfits—District 'A,' 11 parties		7,625 00
Provisions on hand—District 'A,'		1,630 00
Camp outfits—District 'B,' 11 parties		7,865 00
Provisions on hand—District 'B'		2,722 00
Camp outfits—District 'C,' 8 parties		5,720 00
Provisions on hand—District 'C'		19,210 00
Camp outfits—District 'D,' 2 parties		1,430 00
Provisions on hand—District 'D'		5,156 00
Camp outfits—District 'F'		4,140 00
Provisions on hand, District 'F'		5,200 00
		$87,215 57

A. T. GOW,
Accountant.

STATEMENT of Receipts, Expenditures and Liabilities for the month of March, 1905.

Receipts.

March 4—Amount of letter of credit.. .. .. $200,000 00

Expenditures.

Amount of expenditure as per itemized statement sent to the Department of Railways and Canals..... $116,615 26

Liabilities.

Salaries and wages..	$ 49,410 01
Accounts for supplies, expenses, &c..	45,601 99
	$95,012 00

A. T. GOW,
Accountant.

GENERAL SPECIFICATIONS FOR THE CONSTRUCTION OF THE NATIONAL TRANSCONTINENTAL RAILWAY.

Eastern Division.

GENERAL.

Alignment.

1. The centre of the roadbed shall conform in alignment to the centre stakes.

Sub-grade.

2. The grade line of the profile denotes sub-grade, and this term indicates the top of embankments or the bottom of excavations ready to receive the ballast.

Cross-section.

3. The roadbed shall be formed to the section, slopes and dimensions shown upon the standard drawings, or to such modifications thereof as are required to meet special conditions, as may be from time to time directed.

Width of Roadbed.

4. When finished and properly settled the roadbed shall conform to the finishing stakes and shall be of the following dimensions at sub-grade for single track, viz:

On embankments less than 16 feet in height the width shall be 16 feet. On all other heights the widths shall be eighteen feet.

Earth excavations, 22 feet at formation level.

Rock excavation, 20 feet wide at formation level.

Slopes.

5. The slopes of embankments and excavations shall be of the following inclinations, as expressed in the ratio of the horizontal distance to the vertical rise:—

Embankments—

Earth—One and one-half to one.

Rock—One to one.

Excavations—

Earth—One and one-half to one.

Loose Rock—One to one.

Solid Rock—One-quarter to one.

CLEARING AND GRUBBING.

6. The whole or as much of the right of way as the engineer may direct shall be entirely cleared of all trees, logs, brush and other perishable matter; all of which, shall be burnt or otherwise disposed of as the engineer may direct; unless specially reserved to be made into ties, timber or cordwood. Unless directed in writing by the engineer, trees and brush must not be thrown on adjacent lands, but must be disposed of on the right of way. Trees unavoidably falling outside right of way must be cut up, removed to right of way and disposed of.

All trees, stumps, undergrowth and brush within such clearing must be cut so that the tops of same shall not be over eighteen inches above surface of ground.

No allowance will be made for the cutting and removal of grain, grass, weeds or other annual plants on the right of way, the contract price of grading being assumed and understood to cover all such items.

Dangerous Trees.

7. All trees outside the limit of the right of way, considered unsafe by the engineer, shall be cut down and disposed of as 'other clearing,' but no trees shall be cut down unless marked for cutting by the engineer.

How Paid For.

8. Clearing shall be paid for by the acre where actually performed; and dangerous trees cut outside the right of way, at the specified rate per single tree.

Close Cutting.

9. On ground to be covered by embankments more than two feet high all trees and stumps shall be cut off even with the surface of the ground and removed; the price paid for clearing covers close cutting.

Grubbing.

10. In all excavations including borrow pits on all ground to be covered by embankments less than two feet high, and from all ditches, drains, new channels for water ways and other places when required, all stumps and large roots must be grubbed out and removed.

How Paid For.

11. Grubbing will be estimated and paid for by the acre, when actually performed in excavation less than four feet deep, under embankments less than two feet high, and on borrow pits, ditches, drains, and new channels for water within the clearing limits, but no grubbing will be allowed on the slopes of any cutting where the depth at a distance of eleven feet on either side of the centre line exceeds four feet.

Grading—Definition.

12. Under this head will be included excavations and embankments for the formation of the roadbed; all diversions of roads and streams; all borrow pits and ditches, trestles, culverts, buildings and structures, and all similar work connected with and incident to the construction of the roadbed.

Large Blasts.

13. The use of powder or other explosives in large blasts is prohibited unless on written authority of the engineer. In the event of wasting of rock through any such blasting, the contractor shall, if the material is required in the vicinity for the making up of embankments, of which the engineer shall be the judge, furnish at his own cost an equivalent amount of material for such embankment. One yard of rock in place being taken to equal 1½ yards of earth.

Responsibility for Damage.

14. All damage occasioned by blasting of rocks in the progress of the work, to any person, or any injury done by the contractor, or those in his employ, to tracks, rolling

stock, crops, fences, buildings or any property of the commissioners, or of the adjoining land owners or occupants, shall be paid by the contractor, or may be paid by the commissioners and charged to the contractor.

Public or Private Roads.

15. Whenever the line is intersected by public or private roads, the contractor must keep open, at his own expense convenient passing places. All dangerous places must be suitably protected by the customary warning signals, and fences when necessary.

Removal of Ice and Snow.

16. The contractor shall, at his own cost, remove snow and ice from any portion of the work, whenever deemed necessary by the engineer.

Haul.

17. The limit of free haul will be 500 feet. For any haul exceeding 500 feet, the contractor shall be paid at one cent per cubic yard per 100 feet. The yardage overhauled will always be measured and estimated in excavation.

In all cases the work will be estimated so as to make the least cost; that is, if necessary, earth from excavations will be estimated as having been hauled regardless of the fact that the contractor may have preferred to waste the material from the cuts and borrow the material for the fills, but such waste and borrow must be subject to the approval of the engineer, in writing.

TEMPORARY BRIDGE OR HAULWAY.

When the engineer of the commissioners so directs, material will be hauled over or beyond any bridge opening, and the contractor shall construct such temporary bridge or haulway over or around such opening, and shall receive therefor actual cost of such bridge or haulway, including labour and material, plus ten (10%) per cent. This clause does not include the construction of roadways which are to be provided by the contractor under section 244.

EXCAVATIONS AND EMBANKMENTS.

Finishing Slopes.

18. Slopes of all excavations shall be cut true and straight, and all loose or projecting stones on the slopes must be removed.

Excess and Deficiencies of Material.

19. Excess material in excavation shall be used to widen embankments within the limit of haul. No wasting will be permitted except on written authority of the engineer. When the quantity of excavation is insufficient to make up embankments within the limit of haul, the deficiency shall be made up by widening the cuts as directed. No borrowing will be permitted until this manner of obtaining material has been exhausted.

Reservation of Material and Payment Therefor.

20. Whenever gravel suitable for ballasting is found in a cutting, the contractor shall, if required by the engineer, cut a gullet through large enough to pass a train, the remainder of the material being reserved for top dressing or ballasting. The price stipulated in the schedule for common excavation shall cover the gulleting of gravel cuts, the remainder being treated as ballast. When stone suitable for special purposes

is found in a cutting, it shall, if required by the engineer, be reserved for such special purposes, and shall be piled near at hand so as to permit convenient loading on cars. The price paid for piling and reloading such reserved stone shall be the schedule price for same.

Catch Water Ditches.

21. Catch water ditches, as required. shall be made along the tops of excavations to prevent water flowing into the cut. The location and cross-section of such ditches shall be designated by the engineer, and if required, shall be excavated before the cuts are opened.

Tile Drains.

22. When required, four (4″) inch tile drains shall be used; their location shall be as directed by the engineer. The trenches for these tile drains must be excavated below frost line and to a true grade. The tile shall be laid with ends butted, and shall be covered with brush, grass, hay or straw, over which shall be laid gravel or other suitable material, approved by the engineer.

Provision for Settlement.

23. Whenever it is necessary to provide for the future settlement of the embankments, the height and width of the roadbed shall be increased, as directed.

Precautions on Side Hill Ground.

24. When the embankment is to be placed on steep side hill, the surface shall be deeply ploughed, stepped or trenched. If built on wet or spongy ground likely to be affected by water, the contractor shall remove all unsuitable material, and, if required, shall underdrain the same with tile, broken stone or pole drains, as directed.

Cross-waying.

25. When required, in swamps or muskegs, cross-ways shall be put in. They shall be built of logs of such length as shall be directed by the engineer, and not less than six (6) inches in diameter. The depth of the log portion of the cross-way shall not be less than one foot. Said cross-way to be thatched with full limbs and brush to a depth of at least eighteen (18) inches. Such cross-way shall be paid for at the schedule price per acre. (If the cross-logging is two feet or more in depth, with the eighteen inches of brush on top, the price will be the schedule price for two or more acres as the case may be.) No ditches shall be made on either side of cross-ways, except by direction of the engineer.

Embankments Against Masonry.

26. Embankments over culverts of masonry or concrete, or iron or vitrified pipe, shall be built of the best obtainable material. The portion against the sides of the culvert or pipe shall be thoroughly tamped. The portion over the arch or crown shall be deposited as loosely as possible, using all necessary care to avoid injury to the structure or pipe. The price paid for common excavation will cover the cost of doing such work.

Slopes Where Rip-Rap is Used.

27. When directed, embankments or slopes which are to be rip-rapped shall be flattened to a slope of 2 to 1.

SIDE DITCHES, BORROW PITS, ETC.

Side Ditches on Prairie.

28. On prairie or level country, where embankments are much in excess of excavation, the material to form the embankments will usually be obtained from parallel side ditches; such ditches must be made continuous, of uniform cross-section and constructed to a regular grade to facilitate drainage.

Location of Borrow Pits.

29. Borrow pits shall be located in such places as will be approved by the engineer. They shall be regular in width, unless otherwise permitted by the engineer, and if required, shall be connected with ditches and drained to the nearest water course.

Berms.

30. Berms of the following widths must be left between the slope stakes and edge of borrow pits or ditches:

For banks under 3 feet in height, berms 6 feet wide.
For banks 3 to 10 feet in height, berms 8 feet wide.
For banks over 10 feet in height, berms 10 feet wide.

Slopes of Borrow Pits.

31. The side slopes of borrow pits on the right of way nearest the embankment, shall not be less than 1½ to 1, and those nearest to the outside of the right of way, not less than 1½ to 1, always leaving sufficient berm to prevent the right of way fence from caving, but in no case less than four feet.

Borrowing at Stations.

32. Borrowing from the side will not be allowed on either side of the centre line within eight hundred (800) feet of a station building, or a proposed station site, except where otherwise directed by the engineer.

CLASSIFICATION.

33. Grading will be commonly classified under the following heads: 'solid rock excavation,' 'loose rock' and 'common excavation.'

Solid Rock Excavation.

34. Solid rock excavation will include all rock found in ledges or masses of more than one cubic yard, which in the judgment of the engineer may be best removed by blasting.

Loose Rock.

35. All large stones and boulders measuring more than one cubic foot and less than one cubic yard, and all loose rock whether in situ or otherwise, that may be removed by hand, pick or bar, all cemented gravel, indurated clay and other materials, that cannot in the judgment of the engineer, be ploughed with a 10-inch grading plow, behind a team of six good horses, properly handled; and without the necessity of blasting, although blasting may be occasionally resorted to, shall be classified as 'loose rock.'

Common Excavation.

36. Common excavation will include all earth, free gravel or other material of any character whatever not classified as solid or loose rock.

Slides.

37. Material in slips, slides and subsidences extending beyond slopes in cuttings will not be paid for, unless in the opinion of the engineer such occurrences were beyond the control of the contractor, and not preventable by use of due care and diligence.

Classification of Slides.

38. The classification of material from slides, shall be made by the engineer, and will be in accordance with its condition at the time of the slide, regardless of prior condition.

Measurements, How Made.

39. Measurements will usually be made in excavation, and will only be made in embankments when borrow pits of great irregularity only can be had, and where it is not practicable to measure the material in excavation. In such cases the following percentages will be deducted from the bank measurement, viz.: When the bank is made up from side casting and shovel work, 10 per cent; wagon and wheel scraper work, 7 per cent; slush scraper work, 5 per cent.

FOUNDATIONS.

Dimensions.

40. Foundation pits shall be of such dimensions and excavated to such depths as are shown on the plans, and if required, shall be excavated to such further dimensions and depths as may be necessary to insure stability of the structure to be erected according to the instructions of the engineer, but in no case less than is shown on plans, except by the order in writing of the engineer.

Material, Where Deposited.

41. Material excavated from foundation pits shall be deposited in the embankment, unless otherwise directed. Excavations for foundation pits, including those excavated under water, but not requiring caissons, coffer dams or other special appliances, shall be paid for at the schedule price per cubic yard excavated, such excavation to be kept dry, and the schedule price shall include the necessary bailing or pumping. Foundations requiring coffer dams and pumping-excavation shall be made in the dry, that is ample pumping capacity shall be furnished by the contractor to insure dry works, and the price per cubic yard of excavation shall include the cost of said pumping or bailing.

Built to Standard Plans.

42. Foundations must be built strictly according to the general or special plans. Material used in their construction must, in every respect, conform with the specifications of the commissioners.

Tamping.

43. Great care must be used to thoroughly tamp and solidify the ground in the bottom of foundation trenches for bridges, trestles, culverts, buildings or other structures. Where mud sills are used they must be settled to a permanent bearing by ramming with heavy rammers.

SPECIFICATIONS FOR PORTLAND CEMENT.

Brand.

44. No cement will be allowed to be used except established brands of high grade Portland cement, which have been successfully used under similar climatic conditions.

Weight.

45. The average weight per barrel shall not be less than 350 lbs. net. Four sacks shall contain one barrel of cement. If the weight, as determined by test weighing is found to be below 350 lbs. net per barrel, the cement may be rejected.

Names.

46. Bidders will state the brand of cement which they propose to furnish, the name of the manufacturer, location of factory, &c.

Package.

47. The package shall be plainly labelled with the name of the brand and of the manufacturer, and must be put up in good, sound, strong barrels, well lined with paper, or in case where bags can be advantageously used, in good stout cloth or canvas tight sacks.

TESTS.

48. Tests may be made from time to time of the fineness, specific gravity, soundness, time of setting, tensile strength and chemical composition.

Fineness.

49. Ninety-four per cent of the cement must pass through a sieve made of No. 40 wire, Stubbs' gauge, having ten thousand (10,000) openings per square inch.

Specific gravity.

50. The specific gravity of the cement, as determined from a sample which has been carefully dried, shall be between 3·10 and 3·25.

Soundness.

51. To test the soundness of the cement, at least two pats of neat cement mixed for five minutes with 20 per cent of water by weight shall be made in glass, each pat about (3) three inches in diameter and one-half (½) inch thick at the centre, tapering thence to a thin edge. To be well trowelled to work out air bubbles and surplus moisture. The pats are to be kept under a wet cloth until finally set, when one is to be placed in fresh water for twenty-eight (28) days. The second pat will be placed on the rack in 'Faija hot bath tank' over the vapour of water heated to 170° F., and allowed to remain there from 3 to 4 hours, after which it will be placed in the hot water, temperature 170° F., where it will remain for the balance of the twenty-four hours and then be allowed to cool. In some cases it will be found desirable to raise the temperature of the water to the boiling point, 212° F. Neither sample should show distortion or cracks.

Time of Setting.

52. The cement shall not acquire its initial set in less than 45 minutes and must have acquired its final set in ten hours.

The cement is considered to have acquired its initial set when the pat will bear, without being appreciably indented, a wire 1-12 of an inch in diameter loaded with one-fourth of a pound. The final set has been acquired when the pat will bear without being appreciably indented a wire 1-24 of an inch in diameter, loaded to weigh one pound.

Tensile Strength.

53. Briquettes made of neat cement, after being kept in air for twenty-four hours under a wet cloth, and the balance of the time in water shall develop tensile strength per square inch, as follows:

After seven days, 450 pounds; after 28 days, 540 pounds. Briquettes made of one part cement and three parts clean sharp sand, by weight, shall develop tensile strength per square inch as follows: After seven days, 140 pounds; after twenty-eight days, 220 pounds.

Governing Test.

54. The highest result from each set of five briquettes, made at any one time, is to be considered the governing test. Any cement not showing an increase of strength in the twenty-eight days over the seven day test, will be rejected.

Making Briquettes.

55. When making briquettes, neat cement will be mixed with 20 per cent of water by weight, and sand and cement with 12½ per cent of water, by weight. After being thoroughly mixed and worked for five minutes, the cement or mortar will be placed in the briquette mould in five equal layers, and each layer rammed and compressed by thirty blows of a soft brass or copper rammer, ¾ of an inch in diameter (or 7-10 of an inch square with rounded corners) weighing one pound. It is to be allowed to drop on the mixture from a height of about ½ inch. When the ramming is completed, the surplus cement shall be struck off and the final layer smoothed with a trowel held almost horizontal and drawn back with sufficient pressure to make its edge follow the surface of the mould. The briquettes will be kept in air under a wet cloth until set, when they will be placed in clean, fresh water, where they will remain until broken.

Chemical Analysis.

56. Manufacturers shall furnish a chemical analysis which will give the average composition of the cement supplied by them.

SPECIFICATION FOR SAND FOR CONCRETE AND MASONRY.

57. Sand shall be clean, sharp, of variable size of grain, largely silico and must be free of loam, mica or other deleterious substances.

SPECIFICATION FOR STONE FOR CONCRETE.

58. Stone for concrete shall consist of hard, strong stone, granite, gneiss and allied rocks, limestone or other approved solid stone, or suitable gravel approved by the engineer. Under no circumstances will shale, slate or similar friable rocks be used.

SPECIFICATION FOR STONE FOR MASONRY.

59. Stone used for masonry shall consist of the strongest, hardest and best description of rock that can be found. Sound, hard limestone, granite, sandstone (when equal to Wallace stone) or other approved rock. Particular care will be exercised to exclude rock with 'drys,' shaky stratification or weak cleavage planes. All stones shall be laid upon their quarry beds, and shall be well selected, sound stone. Particular care will be taken to exclude all rock shattered by blasting. No stone shall be used for masonry or concrete until it has been approved by the district engineer.

CONCRETE CULVERTS AND CONCRETE PIPES.

60. Concrete culverts must be built in strict accordance with the standard plans, and the concrete used in their construction must strictly conform to the standard specification.

SPECIFICATION FOR CONCRETE.

61. Concrete will be used whenever suitable stone for masonry is not to be had at reasonable cost, it will always be used in foundations, hearting of piers, backing of

abutments, small culverts, and, generally where in the judgment of the chief engineer a more satisfactory work can be had than by other methods. The proportions to be used in making concrete will vary with the nature of the work as hereinafter described. Proportions are to be by measure, the barrel being the unit, being the volume of a 350 pound barrel.

Face Concrete.

62. Face concrete will be used in all cases where the structure is exposed to the air or water, and when the body of the structure is made of concrete, it will consist of one part Portland cement, two parts sand, mixed together thoroughly while dry, when sufficient clean water will be added to bring the mortar to the consistency of rather stiff plasterer's mortar. (A ball of it taken in the hand will retain its form and the impress of the fingers).

Machine-mixed Concrete.

63. Machine-mixed concrete will be acceptable, when a suitable batch mixer is used.

The face concrete will average 2½ inches in thickness, and will be placed as nearly as possible, simultaneously with the mass concrete of the body of the pier or structure. An excellent plan to secure a homogenous mass, is to deposit the face material against the form in a triangular piece, some two inches higher than the regular bed in the body of the pier, then ramming the entire mass together.

Body Concrete for Piers, Abutments and Large Masses—Hand-mixed.

64. The concrete will consist of one part Portland cement, three parts sand, six parts broken stone, the stone shall vary in size, the largest pieces shall pass a 2½-inch ring, the smaller may be of the size of a lima bean.

The sand and cement shall be thoroughly mixed together, dry, when the stone will be added, the whole then to be well wet down and to be thoroughly mixed together with shovels.

Machine Mixed.

65. Machine mixed concrete shall be mixed in approved batch mixers and the whole of the material may be dumped into the mixers at once, providing the apportionment of material is properly made before being placed in the mixers. It is intended to secure wet concrete, the whole mass after being as above described, thoroughly mixed will be deposited in place, *in the dry*. Only in exceptional cases will any concrete under any circumstances be permitted to be deposited through water, and only when the approval of the chief engineer has first been obtained, approving of the method to be used and the proportions to be used. In all cases when large masses of concrete are being placed, subject to the approval of the chief engineer or inspectors, large blocks of approved stone, spaced at least 12 inches apart in every direction and ten inches from the face, may be used—'plums in the pudding.' In fixing the size of the stone to be so deposited, due regard will be had to the mass of the structure; in general the proper size will be found by looking at the drawing of the structure.

Depth of Layers.

66. As a general rule concrete shall not be deposited in layers of a greater depth than 12 inches, the whole layer to be well and thoroughly rammed with suitable rammers. Great care will be required to insure homogeniety in the mass, in depositing on a layer that has set or partially set it must be thoroughly cleaned and wet down. No layer or surface will be rammed smooth. It is desirable to leave the surface as uneven and rugged as is consistent with proper compacting of the layer.

Concrete for Arch Culverts.

67. The concrete composing the arch ring will consist of one part cement, three parts sand, five parts broken stone, mixed and deposited in the manner heretofore described, except that the ring will be built up from both springing lines simultaneously.

Coping Course and Bridge Seats.

68. The concrete for same shall consist of one part cement, two parts sand, four parts finely crushed, hard selected stone, the coarse particles not to exceed three-quarters of an inch and to vary in size down to that of pea size. This coping course to be at least six inches thick. Particular care shall be exacted to insure the thorough mixing and depositing of this layer, which must be placed before the mass beneath it has set. The whole surface to be floated off even and perfectly level, with a wooden float so as to insure a perfectly smooth, even surface.

Tank Foundations.

69. Concrete shall consist of the same quality as that provided for piers and abutments, except that no displacers shall be used in the walls.

Turntable Foundations.

70. Concrete shall consist of the same quality as that provided for piers and abutments.

Ordinary Building Foundations.

71. Concrete shall consist of one part cement, four parts sand, eight parts broken stone or gravel. The broken stone or gravel shall vary in size from two and one-half inches in diameter to pea size. The methods of mixing and depositing to be as heretofore described.

Filling.

72. Filling over and around culverts shall not, in any case, be done before the concrete has set. The minimum time allowed will be two weeks, but may be extended if required.

How paid for.

73. Concrete culverts will be paid for at the specified rate per cubic yard, which will cover the cost of all labour and material incident to their construction, except the preparation of foundations, which will be paid for at the specified rate per cubic yard.

Pointing.

74. Joints below the ground line shall be thoroughly pointed up with a trowel as the work progresses, but need not be raked out.

Joints above the ground line shall be carefully raked to a depth of one (1) inch and pointed up with fresh mortar consisting of one part Portland cement and two parts of sand.

If the structure is subject to the action of running water, or is unusually exposed, the pointing mortar shall consist of one (1) part of Portland cement to one (1) part of sand; and the joints shall be raked out to a depth of one and one-half (1½) inches.

Before filling the joints be careful that they are well cleaned by brushing out all loose matter, and thoroughly wet. Apply the mortar with the trowel and calk the joints so that they will be completely filled.

If pointing is done in very hot weather, great care should be taken by wetting the stones, not to allow the mortar to dry too rapidly. No pointing shall be done in freezing weather.

Laying.

75. All stone, whether face, coping or backing, shall be laid in full flush beds of mortar mixed fresh for the work in hand. In no case shall stone be allowed to touch stone: a good bed of mortar must intervene. Wedging up of stones with spalls or chips will not be allowed. No mortar shall be spread on any stone already laid until the latter has been swept off cleanly and then thoroughly wet. All stones must be free from scales, thoroughly cleaned by washing or otherwise, from sand and dirt, and thoroughly wet before laying. All rear joints shall be thoroughly filled with mortar and struck smooth as the wall is built up.

Quality of Stone.

76. Bridge seats, coping, arch sheeting, ring stones and ashlar or face stones, shall be sound and durable, of best quality, free from any defects, and acceptable to the engineer.

The backing shall consist of sound, durable, well shaped stones, free from defects that will impair their durability or strength, and shall consist of large stones that in general require handling with a derrick.

Copings and Bridge Seats.

77. The bridge seat course shall include the cut stone course upon which the superstructure rests. Each stone of the bridge seats shall be set to the exact proper height to receive the bridge, shall not be less than (20) twenty inches in thickness, two feet and six inches (2′ 6″) in length, and of sufficient width to extend twelve (12) inches into the back or parapet wall. Piers of seven (7) feet, or less, under bridge seat, shall have bridge seats extend across top of pier in one piece. They shall be finely bush-hammered on top to true planes, free from hollows or 'winds,' and shall be laid to joints not exceeding one-half (½) inch in thickness. They shall be laid in full beds of mortar, as grouting will not be allowed.

Copings shall include the top course of retaining walls. They shall not be less than twelve (12) inches in thickness, three (3) feet long, and of sufficient width to extend across the entire width of the wall. Top surfaces shall be bush-hammered, with edges neatly pitched to straight lines. Joints of copings shall not exceed one-half (½) inch.

Arch Sheeting and Ring Stones.

78. Sheeting for arch-culverts shall consist of large sized stone, with radial beds and joints extending through the whole thickness of the arch, and hammer or point-dressed, so as to admit of one-half (½) inch joints. The sheeting shall be laid in continuous courses, care being taken to break joints not less than nine (9) inches, so that the arch will be thoroughly bonded. No stone shall be less than eight (8) inches wide on the intrados. Centres shall not be removed until so ordered by the engineer.

Ring stones shall be dressed to the size and shape shown on the plans, or as directed by the engineer, shall be laid with one-quarter inch joints, and shall bond thoroughly with the sheeting. The joints must be on truly radial lines. Faces shall be left rough and with one and one-half (1½) inch chiseled draft line on the curved margin.

The top of the third-class rubble masonry spandrel backing and arch shall have a coat at least one (1) inch thick of Portland cement mortar, one part of cement to four parts of sand (1 to 4), on top of which apply a coating of about one-quarter (¼) inch thick of straight run coal tar pitch. In case it is not practicable to secure the coal tar, then a richer mortar of one part cement to two parts sand (1 to 2) shall be used, the cost of which shall be included in the price for arch-sheeting and ring stones.

First-class Masonry.

79. *General description.*—First-class masonry shall be used where directed by the engineer, for abutments, piers and retaining walls, and shall consist of rock-faced ashlar work, with rough backing. Edges shall be pitched to straight lines, beds shall be parallel and joints rectangular.

The face stones shall be arranged on their natural beds as headers and stretchers in regular continuous courses, not less than sixteen (16) inches nor more than thirty-six (36) inches in thickness, and the thickness of any course shall not exceed that of the course below it.

Size of Stone.

80. Stretchers must not be less than two and one-half (2½) feet in length, and not less than one and one-half (1½) feet in width; nor in any case less in width than one and

one-quarter (1¼) times their depth. Headers must not be less than four feet long where the wall is of sufficient thickness, and at least two (2) feet longer than the width of the adjacent stretchers, not less than one and one-half (1½) feet in width, nor less in width than they are in depth of course. In walls of five feet or less in thickness, the headers shall extend entirely through the same.

Wing steps shall be of the full thickness of the course.

Cutting

81. Every stone must be laid on its natural bed. All face stones must have beds well dressed, parallel and true to proper line and made to extend the full length and width of the stone. The beds and sides of the face stones must be cut before being placed in the work so as to form joints not exceeding one-half (½) inch in width. No hammering of stone will be allowed after it is set, but if any inequalities occur they must be pointed off. The vertical joints must not be less than ten (10) inches in from the face and as much more as the stone will admit. All corners and batter lines shall be run with a neat chisel draft one and one-half (1½) inches in width on each corner. The projections of the quarry face beyond the draft line shall not exceed four (4) inches. The tops of wing steps shall be bush-hammered to a uniform surface.

Bond.

82. The masonry shall consist of headers and stretchers alternately arranged so as to thoroughly bond together the face stone and the backing, and every header shall be immediately over a stretcher of the underlying course. The stones of each course of face stones shall be so arranged as to form a bond of at least one (1) foot with the stone of the underlying course. Particular care must be taken that the stones in the course below the coping course coming directly under the bridge seats are large and well bedded.

Backing.

83. The backing shall consist of large sized well-shaped stones, laid so as to break joints and thoroughly bond the work in all directions and leave no spaces between them more than six (6) inches in width, as nearly as possible, which space shall be filled with concrete. The courses may correspond with the face stones, but two (2) courses shall fill up one (1) of the face, providing no stone less than six (6) inches thick be used. The broadest bed shall be laid undermost, and must have a good bearing on the stone below. Two-thirds (⅔) of the upper bed shall be of the full thickness of the course.

Second Class.

84. *General Description.*—Second-class masonry shall consist of rock-faced ashlar work. It shall be used for such small arch-culverts, cattle passes, abutments, piers and retaining walls as the engineer may direct, and shall include the portion of the structure above the concrete footing courses.

Face Stones.

85. Face stones shall be of a superior quality, free from defects such as clay seams, dry-seams, weather cracks, &c., shall be rock-faced, with edges pitched to straight lines, with no projections exceeding four (4) inches, and shall have parallel beds and rectangular joints. The beds and end joints for six (6) inches back from the face line shall be point or hammer dressed to three-quarter (¾) inch joints. No face stone shall be less than eight (8) inches in thickness, nor be in breadth less than twelve (12) inches, nor less in length than its breadth. The wing steps shall be of the full thickness of the course and the tops thereof shall be bush-hammered to a smooth surface. All corners or batter lines are to be run with a neat chisel draft of one and one-half inches (1½) on each corner.

Courses.

86. The stones need not be arranged in regular courses, but shall be laid level on their natural beds, arranged as headers and stretchers, with joints well broken.

Bond.

87. At least one-quarter (¼) of the face stones shall be headers not less than three feet (3) six (6) inches long, except where the thickness of the wall is less, and extending through the wall, where the same is four (4) feet thick or less, and at least two (2) feet longer than the width of the adjacent stretcher and so distributed so as to make the best bond. The stone of each course of face-stones shall be so arranged as to form a bond of at least one (1) foot with the stone of the underlying course, except in the case of 'fillers' in broken range work.

Backing.

88. The backing shall be well-shaped, sound, durable stone, not less than six (6) inches thick, at least one-half (½) of which shall measure three (3) cubic feet, to be laid close in full mortar beds and joints, well bonded with face stones and with joints well broken. All spaces between backing and face stone are to be filled with concrete.

Third Class.

89. *General description.*—Rubble masonry shall be used for such small culverts, depot foundations and piers, pipe ends, spandrel backing for arches and other structures as the engineer may direct.

General Conditions.

90. All stones shall be sound and durable, with the face stones free from clay seams, dry seams, weather cracks, &c. They shall be laid on their natural beds, and shall be sufficiently large to make a good, well-bonded, strong job; shall be laid in the most substantial manner and with as much neatness as this description of work will admit.

Dimensions of Stone.

91. No stone shall be used in the face that has more height than breadth of bed. No spalls shall be permitted in the bed joints.

Bond.

92. The whole wall shall be bound together with headers occupying one-fifth (⅕) of the area of the face of the wall, front and rear, and extending through walls three (3) feet or less in thickness.

Coursing.

93. The walls shall be levelled up and coursed longitudinally at least every four (4) feet in height.

Stone to be Roughly Squared.

94. Stone shall be roughly squared on joints, beds and faces laid so as to break joints, and in full mortar beds.

Vertical Spaces.

95. All inside vertical spaces shall be flushed with mortar and then packed full of spalls. No liquid grouting shall be allowed.

All rear joints shall be thoroughly filled and struck smooth as the wall is built up.

Angles.

96. Selected stone shall be used at all angles, and shall be neatly pitched to true lines, and laid on hammer-dressed beds.

Box Culverts—Cover Stones.

97. All stone box culverts shall have a water way at least 2½ x 3 feet. The side walls shall not be less than two (2) feet thick, and shall be built of sound, durable stones, not less than six (6) inches thick, laid in cement mortar (usually one part Portland cement to three parts sand). The walls must be laid in true horizontal courses, but in case the thickness of the course is greater than twelve (12) inches, occasionally two (2) stones may be used to make up the thickness. The walls must be laid so as to be thoroughly bonded, and at least one-fourth (¼) of the area of each course must be headers going entirely through the wall. The top course must have one-half (½) its area of through stones, and the remainder of this course must consist of stone going at least one-half of the way across the wall from the inside face. The face stones of each course must be dressed to a straight edge, and pitched off to a true line. All of the coping stones of head walls must be throughs, and must have the upper surfaces hammer-dressed to a straight edge, and the face pitched off to a true line with margin draft. Cover stones shall have a thickness of at least twelve (12) inches for opening of three feet, and at least fourteen inches for opening of four feet; and must be carefully selected, and must be of such length as to have a bearing of at least one (1) foot on either wall.

The beds and vertical joints of the face stones for a distance of six (6) inches from the face of the wall shall be so dressed as to require a mortar joint not thicker than three-fourths (¾) of an inch. Joints between the covering stones must be not wider than three-fourths (¾) of an inch, and the bearing surface of cover stones upon side walls must be so dressed as to require not more than one (1) inch mortar joint.

Paving Stones.

The paving shall consist of flat stones, set on edge at right angles with the line of the culvert, not less than twelve (12) inches deep, and shall be laid in cement mortar.

Turntable Masonry.

98. Shall consist of second-class masonry as hereinbefore described.

Foundation and Walls for Water Tank.

99. Shall consist of third-class masonry as hereinbefore described.

Walls.

100. The circular walls to be parallel and true to line, and to consist of third-class masonry as hereinbefore described.

CAST-IRON CULVERT PIPE.

Quality—Cast-iron Culverts.

101. They shall be cast vertically in dry sand moulds, and dried cores and shall be coated with Dr. Smith's solutions, while hot, and shall be of the highest quality of metal in use for pipe founding purposes.

Dimensions.

102. The size, length, thickness and weight shall be as in the following table:—

Diameter.	Length.	Thickness.	Weight.
16″	12″	11-16″	1,380 lbs.
18″	12″	¾″	1,800 “
20″	12″	¾″	2,200 “
24″	12″	11-16″	2,400 “
30″	12″	¾″	2,900 “
36″	12″	⅞″	4,100 “
36″	6″	¾″	1,800 “
42″	8″	⅞″	3,200 “
48″	6″	1″	3,000 “
54″	6″	1 1-8″	3,900 “
60″	6″	1 1-4″	4,850 “

SALT GLAZED DOUBLE STRENGTH VITRIFIED PIPE.

Salt Glazed Pipe Culverts.

12″, 14″, 15″, 18″ — Shall be of well burnt vitrified clay, with a smooth, soft glazed surface. true to diameter, straight, in three (3) feet lengths, with bell and spiggott.

Subsoil Drains.

103. Agricultural tile, four (4) inches in diameter, shall be straight, well burnt, true in diameter, and free from cracks or checks.

Reinforced Cement Pipe Culverts.

104. The concrete shall consist of one part cement, two parts sand, five parts 1½ inch diameter broken stone. The reinforcing metal to be in accordance with the best modern practice, and both the mixing of the concrete, the methods of reinforcing, the size of the pipe, length and all other matters in connection therewith, to be approved by the engineer.

Masonry Ends.

105. All to have concrete or masonry ends for protection walls.

Foundations for Pipe.

106. Great care must be taken to get a firm and uniform bearing for pipe culverts, and material for bedding the pipe must be free from stone.

Joints.

107. The joints of all pipe, both iron and vitrified, shall be well and thoroughly packed as shown on standard plans. Cast-iron pipe of 30 inches diameter and over shall be stayed and crowned by wedging in strutts as shown on standard plans. The strutts shall not be removed until sufficient settlement has taken place in the bank. In general, this will not be less than one year from the completion of the filling.

Foundations for Vitrified Pipe.

108. Where vitrified pipe is laid in hard ground the bottom of the trench in which the pipe is to lay should be rounded to fit the pipe as nearly as possible, so that the pipe may rest easily and solidly in its bed. If the ground is soft, a foundation satisfactory to the engineer shall be made.

RIP-RAPPING.

Rip-rap Stone to be Angular.

109. When required by the special or general plans, as ordered by the engineer as protection against the action of water, hand laid or 'Pierre Perdu Random' of angular stones shall be laid or placed on embankments, or about foundations, or at the ends of culverts or masonry or other places, as directed. Boulders shall not be used unless ordered in writing by the engineer.

Size.—How Laid.

The largest procurable stones shall be used, and they shall in no case measure less than one cubic foot. The largest stones shall be placed at the bottom and where the current is the greatest. They shall be laid as closely together as possible so as to avoid large openings.

Trenches.

110. When required, a trench shall be excavated at the base of the slope to such a depth as will insure a solid foundation, and all sand or ice or other perishable matter will be removed.

General Dimensions.

111. In general, the depth of the rip-rapping at the base shall measure three feet at right angles to the slope, and shall gradually taper off to a depth of two feet; but shall, if ordered by the engineer, be built of any required thickness.

How Paid for.

112. Rip-rapping shall be paid for at the specified rate per cubic yard in place, for each class.

PAVING.

Where Used.

113. When required by the general or special plans, as ordered by the engineer, the ends of masonry or concrete culverts, vitrified or iron pipe, the bottom of wooden culverts, and other places, shall be protected by paving.

Description.

114. Paving will be made of flat stones set upon their edges, the longest dimensions at right angles to the waterway in such manner as to leave the least possible space between them, and of such size as to reach through the entire depth of the paving.

Undermining.

115. Great care must be taken at the ends of any piece of paving to make it secure, so it cannot be undermined or cut by water flowing underneath it. The lower end must receive special care to prevent this undermining. A concrete apron shall be provided when required by the engineer.

How Paid for.

116. Paving will be paid for at the specified rate per cubic yard in place.

TUNNELS.

How Built.

117. All tunnels must be built in strict accordance with the general or special plans.

Lining.

118. Tunnels which do not require lining shall be excavated to the section and dimensions shown on the standard plans for 'Tunnels, Rock section.'

Timber, Concrete or Masonry Lining.

119. Tunnels which require lining with timber, masonry or concrete, shall be excavated to the section and dimensions as shown on the standard plans for 'Tunnels, Timbered section.'

Dangerous Rock.

120. The contractor must take out at his own expense all loose or shattered rock which is loose or likely to become so.

Rock Tunnels.

121. Rock tunnels shall be excavated to one foot below profile grade and refilled to such grade with rock spalls or other approved material.

Explosives.

122. The contractor must limit the use of explosives to avoid unnecessarily shattering the roof or sides of the tunnel, or damaging the lining, and the engineer shall have the right to restrict the use of such explosives.

Situation of Lining.

123. Where lining is required, such lining must conform to the standard or special plans.

Lining.

124. Lining will be made with timber, concrete or masonry, as ordered.

Timber Lining.

125. Where timber is used, it shall be red or yellow fir, cedar, oak, tamarac, or white or yellow pine, as may be designated, and must be of the best description of the kind required. It must be hewed or sawn square and to proper dimensions. It must be free from all loose, large or unsound knots, sap, sun cracks, shakes, wanes or other imperfections or defects that would lessen its durability.

Lagging.

126. The lagging shall be in pieces 4 inches thick and 6 inches wide.

How paid for—Timber Price Includes Iron Required.

127. Timber used for lining shall be paid for at the specified rate per thousand feet b.m. of timber left in completed structure, and the price paid per thousand feet will include the cost of the necessary iron and the total cost of all labour incidental to putting the timber and iron in place.

Use of Concrete or Masonry.

128. Where concrete or masonry is used for lining such concrete or masonry must be built in strict accordance with the section and dimensions as shown on the standard plans or special plans, and must conform strictly with the specifications for concrete or masonry.

Protection of Lining from Blasting.

129. The contractor will be required, at his own expense, to protect the lining when in place from the effects of blasting by covering with slabs or otherwise, as most con-

venient. He will also be required to replace at his own expense any lining shattered or crushed in any stage of the work by blasting or other operations of his own.

Cavities Behind the Lining.

130 In lined tunnels the contractor must, at his own expense, fill in any cavities behind the lining, resulting from any cause whatever, so that the roof and sides will in all cases have a firm bearing on the lagging or lining. In timbered tunnels this packing shall consist of timber or stones. When the lining is constructed of concrete or masonry the packing shall consist of stones closely packed together.

Portals.

131. Material in portals will be paid for at the same rate as lining in the tunnel.

Niches or Recesses.

132. Niches or recesses for the protection or convenience of railway employees shall be constructed when ordered.

Drainage.

133. Drainage shall be carefully executed as shown upon the standard or special plans or as directed, and all drains or sources of water shall be treated as directed, the cost of which shall be included in the price per lineal foot of excavation.

Shafts.

134. The number, location and dimensions of all shafts shall be shown as on the plans, or as directed, and the specified price per cubic yard for shaft excavation shall cover all material contained between the surfaces of the ground and the cross-section of the tunnel, as shown on the standard or special plans, and the cost of all labor and material incidental to their construction.

Wells or Sumps.

135. All wells or sumps necessary for the completed tunnel shall be made as directed and shall be paid for at the same rate per cubic yard as shaft excavation.

Tunnel Excavation.

136. Tunnel excavation shall be paid for at the specified rate per lineal foot under cover for 'Tunnel, Rock section' and 'Tunnels, Timber section.' The specified rate per lineal foot shall cover the whole cost of labor and material incidental to the excavation of the tunnel and the haul and deposit of the material in the embankments at the ends of the tunnel, as directed.

Net Section.

137. No allowance shall be made for material taken out beyond the theoretical section shown on the standard or special plans.

Dimensions.

138. The standard dimensions of the tunnel may be varied if found necessary or desired. If the area of the section be not thereby increased no extra allowance shall be made to the contractor on account of such change. If the area of the section be not thereby increased or diminished the specified rate per lineal foot shall be increased or diminished in proportion.

TIMBER STRUCTURES.

To be Built to Plans.

139. All structures must be built in strict accordance with the general or special plans.

Quality.

140. All timber either sawed or hewed must be of the best description of the kind required. As directed by the engineer, it must be sawn or hewn square and to proper dimensions. It must be free from all loose, large or unsound knots, sap, sun cracks, shakes, wanes or other imperfections or defects which would impair its strength or durability.

Quality and Description.

141. The quality and description of timber used for each portion of the structure must be as specified. Stringers must be of long leaf yellow pine, Douglas fir, white pin, or other timber approved by the engineer.

Clearing Ground.

142. Before commencing work on any wooden structure, the ground must be entirely cleared of logs, brush and trees for the whole of the width of the right of way, and during the progress of the work all pile or timber ends, chips and brush, shall be cleared from around the structure and burnt, or otherwise disposed of as the engineer may direct.

Framing.

143. No shimming will be permitted. Great care must be taken in framing all timber structures, to insure a perfect fit at all joints. At the completion of the work they must be left in perfect line and surface.

Erection of Bridges ahead of Track.

144. Bridges must be erected ahead of the track in all cases, but the maximum distance beyond the end of track to which the contractor shall be required to haul timber or other material without extra payment shall not exceed four miles.

PILING FOR FOUNDATIONS.

Timber.

145. Piles may be of oak, rock elm, Douglas fir, tamarac, cedar, hemlock, jack pine and spruce, to be straight, or reasonably straight-grained, sound live timber, free from all bad knots, wind shakes or other defects. All diameters must be measured inside the bark, which shall be removed before delivery.

Dimensions.

146. Standard dimensions for piling are as follows: Minimum lengths in feet 15, 20, 25, 30, 35, 40, 45, 50, over 50. Diameter in inches at small end, 10, 9, 9, 9, 9, 9, 8, 8, over 7½. Butt diameter to be not less than 12 inches or more than 20 inches at five feet from butt.

Lengths.

147. Piles will only be accepted and paid for in lengths which are multiples of five.

How Driven.

148. Unless otherwise directed, all piles shall be sharpened and driven small end down, capped with a suitable iron ring, as the engineer may direct, to prevent spreading or brooming while driving, and, if required, shall be shod with an iron shoe of approved design.

Driving.

149. Piles shall be driven until the fall of a hammer weighing 2,000 pounds, with a clear fall of 25 feet or an equivalent blow, causes a penetration not to exceed 10 inches under the last ten blows, or to such further limit as directed.

Broken Piles.

150. Should any piling be broken in the driving, another sound pile shall be driven alongside, to replace it.

Batter Piles.

151. All piles must be driven vertically unless otherwise shown on the plan. Batter piles will be driven at the batter shown on the plans.

Extra Lengths, How Attained.

152. When necessary to drive to a great depth and piles of adequate length cannot be obtained, one shall be spliced on top of another. The first pile having been driven as far as practicable, it shall be cut off square to receive the following pile, which also must be squared and set on top on the one already driven, using a dowell pin 1-inch diam. in the centre, extending 8 inches at least into each pile. The piles shall, if required, be fastened together by an approved splice.

How Paid For.

153. Piling will be paid for under the heads of 'Piling delivered' and 'Piling driven.'

Engineers' Bill of Lengths only will be Paid.

'Piling delivered' will include piling furnished by the contractor at bridge site, as ordered by the engineer, and will be paid for by the lineal foot, but any lengths in excess of those ordered by the engineer shall not be paid for.

'Piling driven' will be paid for at the specified rate per lineal foot in the finished structure, which will include all work of any kind in connection therewith.

Rings and Shoes, How Paid For.

154. Rings shall not be paid for, but shoes will be paid for at the specified rate per shoe.

SHEET PILING.

Points.

155. Sheet piles shall be cut at the end, so as to form a point at one side and not in the middle, and when driven this point shall be kept next to the pile previously driven to insure contact, and when required by the engineer, the Wakefield type of piling shall be used.

Broken Joints.

156. Where there are two or more rows of sheet piles, they shall be driven with broken joints.

How Paid For.

157. Sheet piling will be paid for at the specified price per thousand feet board measure left in the work.

FRAME TRESTLES.

Cedar for Mud Sills.

158. Mud sills not less than ten inches thick must in all cases be made of sound, live cedar, unless permitted in writing by the engineer. The use of timber other than cedar for this purpose is objectionable, and will be permitted only in case of necessity.

Sills and Posts not to be Buried.

159. Care must be taken not to bury with earth any portion of the sills or posts. All pits for trestle foundations must have free drainage.

Adjustments.

160. All adjustments in height of structures, due to settlement or other causes, must be rectified by jacking up from the bottom to the proper elevation.

Timber Culverts.

161. Timber culverts will be made of sound, hewed or sawn timber, and in accordance with standard plans. They shall be of such dimensions as shall allow the insertion of cast iron or other approved pipe and in accordance with the direction of the engineer. They will be estimated and paid for at the specified price per thousand feet b.m.

Paving.

162. The bottom of timber culverts will be paved to the top of the mudsills with angular rock, when it can be obtained from the adjacent cuttings, otherwise with large boulders if the engineer so elects.

CRIB WORK.

Timber Cribs—How Paid For.

163. Timber cribs used in support of trusses shall be built of timber in quality similar to that used in trestles and according to plans furnished by the engineer, and to his approval, both as to workmanship and material. They will be estimated and paid for by the thousand feet board measure, according to bills furnished by the engineer. Iron contained in them will be paid for by the pound. They will be filled in with angular stones of a size and character satisfactory to the engineer, which shall be placed in the cribs without damage to any portion of the structure, and as the engineer may direct.

Round Timber Cribs for Protection Work.

164. Round timber cribs shall be built in accordance with general plans furnished by the engineer under his direction and to his entire satisfaction, both as to size of material, quality and workmanship.

Quality.

165. Timber must be good, sound, live red or yellow fir, cedar, pine or tamarac, or other wood approved by the engineer, free from wind shakes, loose or rotten knots, and all other kinds of decay.

How Paid For.

166. Timber in cribs will be paid for by the lineal foot, all pieces being estimated only as to length, the varying thickness not being taken into consideration, but only the best available timber must be used as directed by the engineer.

How Filled.

167. Timber crib-work required for sustaining or protecting embankment, or for deflecting or changing the channels of streams will, preferably, be filled with angular rock obtained from excavations adjacent, and care must be taken to work the largest stones to the face. If, however, no suitable material to fill them is found in the excavation, it will be obtained by borrowing.

Trenches.

168. When required, a trench shall be excavated at the base of the slope to such a depth as will insure a solid foundation, and all sand or ice or other perishable matter shall be removed.

Cribs to be Close-fitting.

169. When cribs are built for protection against the action of the waves or the impinging of running streams, the engineer may require the logs to be flattened on

two sides, or he may resort to any other method of making the cribs tight and close-fitting that in his judgment may be necessary.

Quality of Materials.

170. The materials for all timber structures must be such as are approved by the engineer, and the workmanship must be of the best kind to secure the full bearing and strength of the materials, and must in all respects be satisfactory to the engineer.

SPECIFICATION FOR TIES.

First Class Ties.

171. Ties shall be made of the best description of timber tributary to the line of the railway.

Quality and Description of Timber.

172. All timber shall be cut from live, sound trees, free from large or loose knots, wind shakes or other defects which would impair its durability or strength. The following kinds of timber will be accepted in the order named: oak, cedar, tamarac, Douglas fir, pine, hemlock (Black spruce only to be used under the approval of the district engineer).

Size.

173. They shall be hewn or sawn with two parallel straight faces, reasonably straight, exactly eight feet long, full seven inches thick and eight inches face. Sawn square at the ends.

Second Class Ties.

174. They shall be of the same quality and description of timber, but the size may be as follows: Length, exactly eight feet; thickness, full six inches; face, six inches. These shall not be used in main tracks.

TRACK-LAYING.

175. Track-laying will include all work of loading, unloading and handling material, laying the main track, spurs, turnouts, wyes, and other permanent tracks, frogs, switches, rail braces, tie plates, crossings, &c.; laying and spiking plank of road crossings, setting all track markers or signs, and such necessary light surfacing with material from the sides, cutting down or filling up the inequalities of the roadbed as will allow of the passage of trains, without damage to rail or rolling stock, until the proper ballasting is performed.

Second Class Ties.

176. Second class ties may be used in sidings and spurs, if sound and otherwise fit for use.

Bark.

177. Bark must be removed from all ties before they are placed in the track.

Number of Ties.

178. Sixteen (16) ties will be used to each 30 foot rail length, or eighteen (18) ties to a 33 foot rail on tangents, and two additional ties on curves as directed by the engineer.

How Spaced.

179. Ties of full size and uniform standard should be used for joint and shoulder ties. Shoulder ties should be placed not more than 10 inches distant from joint ties;

the remaining ties must be spaced evenly between shoulder ties. All ties must be laid at right angles to the track.

Lining.

180. The ends of cross ties in single track must be lined true on the south and east side of the track.

Adzing.

181. Cross ties must never be notched, but if necessary must be adzed, in order to maintain a true uniform bearing for the tie plate or the base of the rail.

Tie Picks.

182. In moving ties with a pick, the point should be stuck into the side of the tie and not into the face.

Switch Ties.

183. Sawn ties must, except under written authority of the engineer, be used for all permanent switch turnouts, cross-overs and railway crossings, and acute angles, and placed, spaced and lined in exact conformance with the standard plans.

Bolting and Drilling.

184. All joints must be full bolted and rails drilled, when necessary. Nuts must be tightened as required until entirely satisfactory to the engineer.

Compromise Splices.

185. When rails of different weights or sections join each other, it must be done with compromise splice bars, made to fit the different rail sections and bolt holes.

Spiking and Slots.

186. A spike must be driven in each slot, inside and outside of rails and angle bars, except on bridges or trestles where spiking in slots, or against the ends of angle bars, or in any way anchoring the rails to the bridge is prohibited.

Nuts.

187. The nuts of all track bolts shall be placed on the outside of the rails.

Broken Joints.

188. Track shall be laid with broken joints on the main lines and important branches where new steel is used; or minor branch lines where re-laying steel is used.

Variation of Joints.

189. When track is laid with broken joints, they must not vary more than eighteen (18) inches from the middle of the opposite rail.

Short Rails.

190. Short rails shall be used in inside line of rails on curves of large central angle, in order to maintain position of joints near center of outer rail.

Cross Spiking.

191. Track must be fully spiked, using the system commonly known as 'Cross spiking,' with the inside and outside spikes driven on opposite sides of the centre of the tie. They must be set as far apart as the face and character of the tie will permit.

Vertical Spiking.

192. Spikes must be set one-half of their own width from edge of rail and driven vertically to full bearing on base of rail, and they must be kept in this position. Driving sloping spikes, or giving them a final lateral blow to close the spikes against the rail, is forbidden.

Use of Gauge.

193. The track gauge must always be used when spiking.

Boat Spikes.

194. Boat spikes 8 inches x $\frac{3}{8}$ inches shall be used for spiking frog and switch blocking to ties.

Elevation.

195. The elevation of the outer rail will be as ordered, and great care must be used to keep the elevation uniform. The grade line must be maintained along the inner rail and the elevation obtained by raising the outer rail. The full elevation of outer rail must not be continued beyond the end of the central curve, but shall decrease uniformly, as the Engineer directs, generally one-half inch in 30 feet, along the easement curve to the tangent point, where both rails should be level.

Elevation on Non-spiral Curves.

196. For curves not having ends eased the full elevation should be extended to the end of the curve where it should run out gradually on a tangent to a level with the inner rail, by reducing the elevation of the outer rail one-half inch to 30 feet rail length, except in cases where tangents are too short to permit.

Level Rails.

197. On all tangents the tops of the rails must be level with each other, except the approaches to the curves that are not eased.

Track Level.

198. The track level must be used when surfacing either curves or tangents.

Gauge.

199. Gauge of track must be exactly and uniformly as prescribed.

Standard Gauge.

200. The standard gauge is 4 feet 8½ inches. Extra width of gauge on account of curvature must be given, as follows:—

On curves of 3 and 4 degrees	$\frac{1}{8}$ inch.
On curves of 5 and 6 degrees	$\frac{1}{4}$ inch.

Extra Width of Gauge.

201. The extra width of gauge should be given by the inside rail and uniformly decreased, on the easement curve, from point of central curve to point of tangent.

Handling Rails.

202. Rails must be handled carefully before being put in the track, and must be uniformly supported after being placed there. Skids will invariably be used whenever necessary to unload them into piles. In all cases the greatest care must be used to avoid injury to rails by dropping them on hard substances or uneven surfaces.

Drilling.

203. When necessary to make holes in rails for bolts, they must be drilled with the proper tools furnished for that purpose.

Brand.

204. The position of the brand on the rail is immaterial, whether right or left, inside or outside, but its position must be uniform in the some line of rails. When new rails are being laid, different brands must not be mixed.

Curving.

205. All rails for curves over 2 degrees must be separately curved by an approved rail bender before being placed in the track. The sledging or dropping of rail on ties to curve them, is forbidden.

Care in Curving.

206. Particular care must be given to insure uniform curvature of the rails throughout their length, in accordance with the following table:—

For 2 deg.	curve,	30 feet,	$\frac{1}{2}$-inch.	33 feet,	$\frac{5}{8}$-inch.
4	"	"	$\frac{3}{4}$-inch.	"	$\frac{7}{8}$-inch.
5	"	"	$1\frac{1}{4}$-inch.	"	$1\frac{3}{8}$-inch.
6	"	"	$1\frac{1}{2}$-inch.	"	$1\frac{3}{4}$-inch.

Expansion.

207. Proper allowance must be made for expansion according to temperature of rail when being laid. When the average thermometer reading on 30 or 33 feet rails is :

90	deg. Fah.	give 0	expansion space.
70 to 90	"	$\frac{1}{16}$"	"
50 to 70	"	$\frac{1}{8}$"	"
30 to 50	"	$\frac{3}{16}$"	"
10 to 30	"	$\frac{1}{4}$"	"
10 to 10	"	$\frac{5}{16}$"	"

208. Rails must not be bumped together when being laid.

Iron Shims.

209. Proper expansion must be secured by using iron shims, according to the above specifications, except where track is laid on a steep grade, when sawn wooden shims of proper thickness will be provided. They must be left in place until track is fully spiked, bolted and anchored, and then removed.

Tie Plates.

210. Where tie plates are ordered, they must be placed in pairs one on each end of the tie. The end with the widest margin must be placed on the outside of the rail.

Spiking on Tie Plates.

211. On tangents only two spikes should be used in each plate; on curves use three or four as required. In general, on curves less than 6 degrees, three spikes should be used, and on sharper curves four spikes.

How put on.

212. Tie plates must be forced into the ties before trains are allowed to run over them.

Rail Braces.

213. Rail braces must be used on guard rails and switches, as shown on the standard plans, and on curves where ordered.

Switches.

214. Switches must be put in track in accordance with the standard plans. No stub switches shall be allowed in main line or cross-overs.

Stub Switches.

215. At all stub switches, bridle rods must be confined between two ties, placed six inches apart.

Lead Rails.

216. Lead rails in all turnouts must be curved separately with the rail bender before being laid. The narrow places between rails at frogs, guard rails and switches must be filled with standard wooden blocks.

Difference in Weight of Rails.

217. When rail of a heavier pattern is used in the main track than in the side track, the main track pattern must extend as far up the side track, at least as far as the switch ties extend.

Derailing Switches.

218. A standard deraling switch, stop block or safety switch must be placed at the clearance point of all sidings when ordered.

Guard Rails.

219. Guard rails must be placed at frogs, switches, and, when ordered, on sharp curves and bridges.

Track Markers.

220. All standard track markers and signs must be placed strictly in accordance with the standard plans.

Lengths paid for.

221. Only such sidings, spurs, turnouts, wyes and other track, and such lengths thereof as ordered will be estimated and paid for.

Surfacing.

222. The track will be surfaced with material obtained from the side, or with train hauled material, as directed by the engineer, but in no case shall the bottom of the ties be raised more than 3 inches above sub-grade.

Surfacing from the Side.

223. 'Surfacing A' will include all work of procuring surfacing material from side ditches or other places where allowed, putting under the track, surfacing, lining and all other work incident to the preparation of the track for running work trains, where material for surfacing is obtained from the side.

Surfacing from Train Hauled Material.

224. 'Surfacing B' will include the cost of all train hauled material under the track, surfacing, lining and all other work incident to the preparation of the track for running work trains where surfacing is done with train hauled material other than ballast. The surfacing must be kept up with the track-laying as far as possible. All new tracks must be brought to surface and tamped up before it is run over. Rails that are damaged by reason of neglect on the part of the contractor, will be replaced at his expense.

BALLASTING.

225. Ballasting will include the loading, hauling, unloading alongside of track, and transportation of all material hauled by train for the purpose of ballasting the track, said material to be duly accepted as ballast by the engineer. Ballast shall consist of broken stone, gravel, or coarse sand, approved by the engineer.

Ditches.

226. All road and surface ditches will be left clear and free, so open and extended as to conduct water freely and quickly from the road-bed, and all side ditches must be left unobstructed.

Slopes.

227. The side slopes and ditches must be left neat and smooth, and free from all rubbish, materials and obstructions.

Material for ballasting must not be taken from the slopes of embankments.

Land.

228. The land for ballast pits and approaches thereto will be furnished by the Commissioners and approved by the engineer. In selecting land for this purpose, a preference will always be given to those points where the best material can be procured within a reasonable distance as determined by the engineer. During the working of any pit, should the material be found unfit for ballasting, the engineer shall compel the contractor to close such pits and open others.

Distribution of Ballast for Embankment.

229. The surface of the ballast pits shall be stripped of soil where such exists, and no material whatever shall be placed on the road-bed but good clean gravel. The maximum size of gravel must not be greater in diameter than three (3) inches.

First Lift.

230. Material sufficient for the first lift of six inches shall be delivered along the track, the track must then be raised so that there will be an average depth of six inches below the ties and the ballast must be well packed and tamped under and around them. As the raising proceeds, the end of the lift shall extend on not less than three rail lengths, and before trains are allowed to pass over the inclined portion of the track, it must be made solid to prevent bending the rails or twisting the joints.

Second Lift.

231. Precisely the same method shall be followed in making the second lift, so as to secure a uniform thickness of twelve (12) inches under the ties. The ballast shall fill the space between the ties full and shall conform to the section shown in the standard drawing.

Tamping.

232. Three feet at each end of each tie shall be thoroughly tamped, the centre of the tie to be loosely tamped. After this lift, the track shall be centered, lined, topped, surfaced, and trimmed off to the proper form and width.

Ballasting to be Kept up to Track Laying.

233. The ballasting must be kept up to the track laying in so far as is possible. All new track must be brought to surface and tamped up before it is run over. Rails that are damaged by reason of neglect on the part of the contractor to comply with these requirements, will be replaced at his expense.

Lining.

234. When the surfacing and ballasting is completed, the track must be in perfect line, surface and gauge, and must be so maintained by the contractor until it is accepted by the Commissioners for operation. This contemplates a second adjustment of track to line and grade after it is settled under traffic.

SPECIFICATION FOR FENCES.

Fence.

235. The fence shall consist of an approved wire fencing at least 4 feet 6 inches high, properly fastened to cedar posts as hereinafter specified, with suitable staples, stretched and built in a workmanlike manner in every respect, and to the satisfaction of the engineer. The posts shall be of sound, live cedar, 5 inches in diameter at the top, 8 feet 6 inches long, reasonably straight with limbs and knots dressed off smoothly, with the bark removed. Such posts shall be spaced sixteen and one-half feet centre to centre, placed three feet six inches depth in the ground, and thoroughly tamped. At all road crossings, farm crossings, jogs in the line of the fence and at intervals not exceeding 20 rods, braced panels shall be built, having the posts spaced eight feet apart and a diagonal brace piece at least five inches in diameter at the top, shall run from a point about one foot below the top of the end post to a short distance above the ground line of the adjacent post. The diagonal piece shall be notched into the post and be thoroughly nailed thereto with 6-inch wire nails. The posts for brace panels shall be carefully selected not less than 8-inch diameter at the top and ten feet long. They shall be set four feet in the ground and firmly tamped. After the wire is strung the top of the post shall be cut true to a line and at an angle of 45 degrees for the purpose of shedding rain.

Posts in Shallow Soil.

236. When the depth of the soil will not admit of the post holes depth called for above, 1 or A frame posts as shown on the standard drawing will be required. The foot of such posts shall be loaded with stones to prevent overturning.

Fences at Highway Crossings.

237. At all highway crossings the fence shall be turned into the cattle-guard and the posts shall be spaced equally apart to enable a sixteen foot, 1-inch x 8-inch board to be nailed at he end and the centre, to the top of the posts. Such board being on edge and the line of boards to run from the fence to the cattle-guard.

Gates.

238. Gates shall be made of an approved pattern of gas pipe frame and strung with wire, and to include suitable hinges and fastenings.

Cattle-guards.

239. Cattle-guards shall be placed at all highway crossings. They shall be of an approved pattern, made in sections with provision for removal without injury to the guard. The form and section to be approved of by the engineer.

HIGHWAY CROSSINGS.

How Graded.

240. The approaches to the rail level shall be graded on a slope not more than five (5) per cent with width of roadway, of not less than 20 feet.

Signals.

241. At each highway crossing at rail level, there shall be placed a sign-board with the words 'Railway Crossing' on both sides of the board (and in the province of Que-

bec, in French also the words 'Chemin de Fer') in black letters on white ground, six inches in height. The board is to be framed into a cedar post firmly bedded at least four feet in the ground and at least 13 feet above the surface of the road.

Planking.

242. The highway at rail level shall be planked with three-inch plank, packed up with 2 x 3-inch pieces resting on the ties. To have four planks 12 inches wide between the rails and two outside, one on either side level with the track. For single track crossing, to be 20 feet in length, at right angles to the direction of the highway.

Farm Crossings, How Graded.

243. The approaches shall be graded to insure a good roadway. When practicable, not to exceed a five (5) per cent approach, the width of the finished road to be twelve feet. The crossing to be planked with four planks, two inside and two outside the rails. The interim space between the inner planks to be thoroughly packed with hard stones or gravel.

GENERAL.

Contractor to Provide Wagon Roads, &c.

244. The contractor, at his own cost, must provide all wagon roads to reach and carry on the work; he must also provide all tools of every description and all supplies required for the prosecution of the work.

Prices for Buildings to Include Foundations.

245. The prices paid for buildings, water tanks, turntables, depots, section houses, and other standard structures, shall be as per schedule of prices.

Material to be Furnished by the Commissioners.

246. Unless otherwise provided, it shall be understood that the Commissioners are to furnish the contractor all the rails, fastenings, tie plates, track bolts, spikes, ties and steel bridges, either on board cars at the nearest accessible point by rail or at steamer landing, or at points along the line of road to be constructed, as may be provided by the special contract.

Other Materials.

247. All other materials required for the construction of the railway shall be supplied by the contractor at the schedule price for same.

Contractor to Handle all Material.

248. The contractor will be required to handle all material at his own expense, including unloading and loading in cars, and all material must be unloaded from cars within three days after its arrival, unless special authority to the contrary is given by the engineer. Any violation of this rule will subject the contractor to the usual demurrage.

Hauling.

249. Whenever cross-ties, piles, timber or other material is delivered along the line of the road, the contractor must do the hauling to put in place, including the loading in cars when necessary.

STANDARD SPECIFICATIONS FOR STEEL RAILS.

How Made.

1. (*a*) Steel may be made by the Bessemer or open-hearth process.
(*b*) The entire process of manufacture and testing shall in accordance with the

best standard current practice, and special care shall be taken to conform to the following instructions.

(*c*) Ingots shall be kept in a vertical position in pit-heating furnaces.

(*d*) No bled ingots shall be used.

(*e*) Sufficient material shall be discarded from the top of the ingots to insure sound rails.

Chemical Properties.

2. Rails of the weight per yard specified below shall conform to the following limits in chemical composition, namely, 80 lb. rails.

Carbon....	0·43—0·53
Phosphorous shall not exceed....	0·10
Silicon shall not exceed....	0·20
Manganese..	0·80—1·10

Physical Properties.

3. One drop test shall be made on a piece of rail not more than 6 feet long, selected from every fifth blow of steel. The test piece shall be taken from the top of the ingot. The rail shall be placed head upwards on the supports and the sections shall be subjected to the following impact tests : eighty pound rails per yard, to have height of drop, eighteen feet. If any rail break when subjected to the drop test two additional tests will be made of other rails from the same blow of steel, and if either of these latter tests fail, all the rails of the blow which they represent will be rejected; but if both of these additional test pieces meet the requirements, all the rails of the blow which they represent will be accepted. If the rails from the tested blow shall be rejected for failure to meet the requirements of the drop test, as above specified, two other rails will be subjected to the same tests, one from the blow next preceding, and one from the blow next succeeding, the rejected blow. In case the first test taken from the preceding or succeeding blow shall fail, two additional tests shall be taken from the same blow of steel, the acceptance or rejection of which shall also be determined as specified above, and if the rails of the preceding or succeeding blows shall be rejected, similar tests may be taken from the previous or following blows, as the case may be, until the entire group of five blows is tested, if necessary. The acceptance or rejection of all rails from any blow will depend upon the results of the tests thereof.

Heat Treatment.

The number of passes and speed of train shall be so regulated that on leaving the rolls at the final pass, the temperature of the rail will not exceed that which requires a shrinkage allowance at the hot saws of six inches for 85 and $6\frac{1}{8}$ inches for 100-lb. rails, and no artificial means of cooling the rails shall be used between the finishing pass and the hot saws.

Test Pieces and Methods of Testing.

4. The drop test machine shall have a tup of 2,000 lbs. weight, the striking face of which shall have a radius of not more than five inches, and the test rail shall be placed head upwards on solid supports 3 feet apart. The anvil block shall weigh at least 20,000 pounds and the support shall be a part of, or firmly secured to, the anvil.

Analysis.

5. The manufacturer shall furnish the inspector daily with carbon determination of each blow, and a complete chemical analysis every twenty-four hours, representing the average of the other elements contained in the steel. These analyses shall be made on drillings taken from a small test ingot.

Finish.

6. Unless othewise specified, the section of rail shall be the standard recommended by the American Society of Civil Engineers, and shall conform, as accurately as possible, to the templet furnished by the Commissioners, consistent with paragraph No. 7, relative to the specified weight. A variation in height of $\frac{1}{64}$ inch less and $\frac{1}{32}$ inch greater than the specified height will be permitted. A perfect fit of the splice bars, however, shall be maintained at all times.

Weight.

7. The weight of the rails shall be maintained as nearly as possible, after complying with paragraph No. 6, to that specified in contract. A variation of one-half of one per cent for an entire order will be allowed. Rails shall be accepted and paid for according to actual weights.

Lengths.

8. The standard length of rails shall be 33 feet. Ten per cent of the entire order will be accepted in shorter lengths, varying by even feet, down to 27 feet. A variation of $\frac{1}{4}$ inch in length from that specified will be allowed. The ends of rails shorter than 33 feet, are to be painted green.

Holes for splice bars.

9. Circular holes for splice bars shall be drilled in accordance with the specifications of the purchaser. The holes shall accurately conform to the drawing and dimensions furnished, in every respect, and must be free from burrs.

Straightening of rails.

10. Rails shall be straightened while cold, smooth on head, sawed square at ends, and prior to shipment, shall have the burr occasioned by the saw cutting removed, and the ends made clean. No. 1 rails shall be free from injurious defects and flaws of all kinds.

Branding.

11. The name of the maker, the month and year of manufacture, shall be rolled in raised letters on the side of the web, and the number of the blow shall be stamped on each rail.

Inspection.

12. The inspector representing the purchaser shall have all reasonable facilities afforded him by the manufacturer to satisfy him that the finished material is furnished in accordance with these specifications. All tests and inspections shall be made at the place of manufacture prior to shipment.

No. 2 rails.

13. Rails that possess any injurious physical defects, or which for any other cause are not suitable for first quality or No. 1 rails, shall be considered as No. 2 rails, provided, however, that rails which contain any physical defects which seriously impair their strength shall be rejected. The ends of all No. 2 rails shall be painted white in order to distinguish them. No. 2 rails shall not in any case be laid in the main line.

Guarantee.

14. The manufacturer shall furnish the Commissioners with a five (5) year guarantee of approved form.

SESSICNAL PAPER No. 62c

STANDARD SPECIFICATIONS FOR STEEL SPLICE-BARS.

How made.

1. Steel for splice bars may be made by the Bessemer or open-hearth process.

Chemical Composition.

2. Steel for splice bars shall conform to the following limits in chemical composition:—

Carbon shall not exceed..	0·15 per cent.
Phosphorus shall not exceed	0·10 "
Manganese	0·30 to 0·60 "

Physical Qualities.

3. Splice bar steel shall conform to the following physical qualities:—

Tensile strength, pounds per square inch, 54 to 64,000; yield point, pounds, per square inch, 32,000; elongation, per cent in eight inches shall not be less than 25.

Test Specimen.

4. *(a)* A test specimen cut from the head of the splice bar shall bend 180° flat on itself without fracture on the outside of the bent portion.

(b) If preferred the bending test may be made on an unpunched splice-bar, which, if necessary, shall be first flattened and shall then be bent 180° flat on itself, without fracture on the outside of the bent portion.

Physical Properties.

5. A test specimen of 8-inch gauged length, cut from the head of the splice-bar, shall be used to determine the physical properties specified in paragraph No. 3.

Tensile Specimen.

6. One tensile specimen shall be taken from the rolled splice bars of each blow or melt, but in case this develops flaws, or breaks outside of the middle third of its gauged length, it may be discarded and another test specimen submitted therefor.

Bending Test.

7. One test speciment cut from the head of the splice-bar shall be taken from a rolled bar of each blow or melt, or if preferred the bending test may be made on an unpunched splice-bar which, if necessary, shall be flattened before testing. The bending test shall be made by pressure or by blows.

Yield Point.

8. For the purpose of this specification, the yield point shall be determined by the careful observation of the drop in the beam or halt in the gauge of the testing machine.

Analysis.

9. In order to determine if the material conforms to the chemical limitations prescribed in paragraph No. 2 herein, analysis shall be made of drillings taken from a small test ingot.

Rolling.

10. The angle bars must be rolled to shape in strict conformity with standard templates which shall be made for each of the several sizes and sections of bars required, from the dimensions shown on drawings or blue prints of same which will be furnished by the Commissioners; particular attention will be required that the height of the bars, as determined by the fishing angles, is also at the proper distance from

the centre line of the rail section, as shown by the standard drawings of same furnished by the Commissioners as the proper fit of the bars to the rails depends on this feature, its strict observance will be insisted upon. The bars must be rolled with a smooth surface finish and be free from cracks or fins on the edges.

Before cutting up into splice-bar lengths the hot bars must be run upon proper hot beds and be held in position to insure cooling as uniformly as possible.

Branding.

11. The name or initial of the maker, and date and year of rolling, also the designation of the particular rail section to which they apply, as per standard drawings, are to be rolled upon the bevel of each bar, in such position as not to be under the heads or butts of bolts.

Shearing.

The knives of the shears must be well and properly shaped, and at all times kept sharp, and must shear clean, without tearing, cracking or leaving 'fins' on the bars.

Punching.

In all bars, the entire number of holes must be punched at one operation, and so as not to cause 'swelling' in the edges of either of the finishing angles, and must be punched clean and smooth, leaving no crack or burrs. The punches must be set accurately in line and centre, spaced in strict conformity with the standard templets made from drawings furnished by the commissioners. The punches and dies must at all times be kept sharp and in good order. Punching one hole at a time is absolutely strictly prohibited, and plates so punched will be rejected.

Notching.

All the spike 'notches' in any one bar must be punched at one operation and must strictly conform, both in size and shape, with the dimensions shown on standard drawings of same.

Inspection.

All bars must be straight and free from kinks in any direction.

Tests and Inspections of Templets with Drawings.

12. The inspector representing the Commissioners must compare all 'cold templets' and gauges to see that they are in strict conformity with the dimensions given by the standard drawings for any section, and any templet or gauge not so conforming must be readjusted or replaced, and any heat of steel or splice-bar found by him not to be in conformity with every requirement of this specification shall be rejected by said inspector. All tests and inspections shall be made at the plant of the manufacturers prior to shipment.

SPECIFICATIONS FOR TELEGRAPH LINE.

Line.

1. The line shall be built to the stakes set for the poles.

Poles.

Poles shall be spaced, thirty-five (35) to the mile.

Poles to be Used.

2. The poles used shall be of slow growth timber, well seasoned and shall have the bark removed immediately after being cut down. They shall be cut in the winter, be reasonably straight, free from serious knots or cracks and sound throughout, and shall be of cedar.

The size and depth in ground to be as in the following table:—

Length of pole.	Diameter at top.	Diameter at 6 ft. from butt.	Depth of pole in ground, under average conditions.
Ft.	In.	In.	Ft.
30	6	11	5½
35	6	12	5½
40	7	12½	6
45	7	13½	6½
50	7	14½	7
55	7	16	7
60	7	17	8
65	7	19	8

How Built.

3. The poles shall be placed in the ground, the depth shown in the above table, the holes for the poles shall be excavated to the full depth called for and at least four inches in diameter larger than the pole. The earth around the pole shall be thoroughly tamped, two men tamping to one man shovelling. The earth is to be banked up at least one foot higher than the surface of the ground at the foot of the pole.

Guys and Anchors.

4. The poles at all angles should be guyed to anchors, as shown on standard drawings.

Foundations.

5. In boggy, swampy ground the poles shall have framed feet and braces or may be pointed as directed by the Engineer. In rock, the hole shall be blasted out to the depth called for.

Framing of Poles.

6. Poles shall be cut square at the butt, the top shall be dressed and notched for cross-arms to the forms shown on the standard drawing.

Cross-arms.

7. Shall be made of the form shown on the standard drawing, and shall generally be six feet long, 3¼ inches x 4¼ inches, bored for six wires.

Pins.

8. Oak pins are to be as shown on standard drawing.

Glass Insulators.

9. Approved glass insulators shall be furnished.

Height Above Ground.

10. Care will be required in crossing highways and railways; the lowest wire shall be at least 25 feet from the ground or rail level, as the case may be. In crossing ravines, long poles will be selected so as to make as easy a gradient for the wire line as the nature of the country will admit.

Tying Wire to Insulators.

11. The most approved attachment for securing the wire to the insulator will be used, as shown on the standard drawing. The wire to be used for such attachment should be a piece of the line wire.

Splicing Wire.

12. Splicing of the line wire will be carefully done in the most approved manner. The McIntyre sleeve joint or other equally good sleeve joint shall be used, subject to the approval of the engineer.

Tension of Wire.

13. The wire shall be drawn up tightly with a 'Come Along' set of clamps with jaws that will not kink or injure the wire. The tension will be fixed by noting the sag in the line of wire at the centre of the clear space, in accordance with the following table:—

Temperature of air in deg. Fah.	Span in Feet.					
	75	100	115	130	150	200
	Sag in Inches.					
30	1	2	2½	3½	4½	8
10	1¼	2½	3	4	5	9
10	1½	2⅝	3½	5	5⅝	10¼
30	1¾	3	4	7	6¾	12
60	2½	4¼	5½	7	9	15⅝
80	3½	5⅝	7	8½	11¼	18¾
100	4⅓	7	9	11	14	22½

IRON WIRE FOR TELEGRAPH AND TELEPHONE LINE.

Specification of Wire.

14. (*a*) The wire must be soft and pliable and capable of elongating 15 per cent without breaking after being galvanized.

(*b*) Great tensile strength is not required, but the wire must not break under a less strain than 2½ times its weight, in pounds, per mile.

(*c*) Tests for ductility should be made as follows:—The piece of wire will be gripped by two vises, 6 inches apart and twisted. The full number of twists must be distinctly visible upon the 6-inch piece between the vises, and the number of twists must not be less than 15.

(*d*) The weight per mile for the different gauged wires must be: For No. 4 B.W.G., 730 lbs.; No. 6, 540 lbs.; No. 8, 380 lbs.; No. 9, 320 lbs.; No. 10, 250 lbs.; or as near these figures as practicable.

(*e*) The electrical resistance of the wire in ohms per mile, at a temperature of 68° Fah. must not exceed the quotient arising from dividing the constant number 4800 by the weight of the wire in pounds, per mile. The coefficient ·003 will be allowed for each degree Fah. in reducing to standard temperature.

(*f*) The wire must be well galvanized and capable of standing the following test. Several samples of the wire shall be taken at random and immersed in a saturated solution of copper sulphate, for one minute. They should then be wiped dry and clean, and the operation repeated four times. If at the end of the fourth immersion there

is no appearance of a copper deposit on the wire, the sample remaining *black,* as after the first immersion, the sample is satisfactory. If, however, a deposit of copper does appear, the wire should be rejected.

(*g*) The grade of iron wire to be used is that known as 'Extra Best Best' and the weight per mile ohm shall be from 4,700 to 5,000 pounds.

(*h*) The line wire shall generally consist of No. 8 B.W.G. galvanized iron wire as above specified. Where considered necessary and desirable by the chief engineer, No. 12 B. & S. gauge hard drawn copper wire may be substituted.

Lightning Arresters.

14. On every fifth pole and every office pole, lightning conductors shall be provided. They shall consist of heavily galvanized No. 8 B.W.G. iron wire, at least six feet shall be formed into a flat coil and placed in the hole under the butt end of the pole, and the wire shall be carried up and stapled to the pole on the side opposite the cross arms, and extended about four inches above the top of the pole.

Equipment.

15. The contractor shall furnish all the batteries, instruments, switchboards and all necessary equipment, in every particular, to secure a first-class installation, having due regard to the requirements of the service, the whole to be done in a workmanlike manner, fully guaranteed and to the satisfaction of the chief engineer.

TURNTABLES.

Shall be of medium steel plate girder type, seventy-five feet long with a capacity of 200 tons.

TRACK SCALES.

Shall be the 100 tons capacity, 64 feet long and shall be housed from the weather and shall consist of the most approved pattern of railroad track scales, with concrete or masonry foundations, and all to the satisfaction of the engineer.

BUILDINGS.

Tool houses, outbuildings, section houses, passenger or combination freight and passenger station buildings, freight sheds, engine houses, car and locomotive repair shops and such other buildings as may be required, shall be built in accordance with the detailed plans and specifications which may be furnished from time to time by the chief engineer.

WATER STATIONS.

Water tanks shall be built frost proof, minimum capacity of 50,000 gallons, resting on concrete or masonry foundations, in accordance with the detailed plans and specifications, and to the satisfaction of the chief engineer.

STEEL BRIDGES.

Shall be designed and built in accordance with the provisions of the general specifications for railway bridges, issued by the Department of Railways and Canals, 1905 edition. The class of loading to be used for all bridges is that designated—heavy.

TRANSCONTINENTAL RAILWAY.

(Eastern Division.)

District.....Section.....

..... Contractor.

Estimate of work done and material furnished for the month of 190

Item.	Description of work.	Measure.	Quantity.	Rate.	Amount.
				$ cts.	$ cts.
1	Clearing.....	acre.			
2	Trees cut down outside right of way..... ...	each.			
3	Grubbing	acre.			
4	Solid rock.....	c. yd.			
5	Loose rock and other materials, sec. 35.....	"			
6	Common excavation, 500 ft. haul.....	"			
7	Excavation in foundations, no coffer dams, 500 ft. haul.....	"			
8	Excavation of foundations, within coffer dams, 500 ft. haul	"			
9	Overhaul, all materials per c. yd. per 100 ft. over 500 ft. haul.....	"		0 01	One cent.
10	Piling delivered as per engineer's bill	l. ft.			
11	Piling driven.....	"			
12	Sheet piling per M. ft. b.m.				
13	Wakefield type "				
14	Cross-logging, 1 ft. deep with 18-in. brushwork.	acre.			
15	Pole drains.....	l. ft.			
16	French stone drains.....	"			
17	Paving in culverts.....	c. yd.			
18	Crib filling with stone.....	"			
19	Hand laid rip-rap..... ..	"			
20	Pierre Perdu random rip-rap	"			
21	Piling out reserved stone from rock cuttings....				
22	Round logs in cribs	l. ft.			
23	Cedar mud sills, per M. ft. b.m.....	...	..		
24	Framed trestles, " except stringers.	..	.....		
25	Caps, walings and braces for pile trestles, per M ft. b.m				
26	Sawn ties and guard rails for bridges per M. ft. b.m.....				
27	Stringers per M. ft. b.m.....	....	....		
28	Cedar timber in culverts, 8-in. x 12-in., 10-in. x 12-in. and 12-in. x 12-in., per M. ft. b.m....	....	.		
29	Plank in highway and private road crossings, per M. ft. b.m.....	....	....		
30	Timber, best quality, for culverts, per M. ft. b.m.	...	....		
31	Vitrified pipe culverts, 12-in. diam.....	l. ft.			
32	" 14-in. diam.	"			
33	" 15-in. diam.....	"			
34	" 18-in. diam.....	"			
35	Reinforced concrete pipe, 12-in. diam.....				
36	" 14-in. diam.....	"			
37	" 16-in. diam.....	"			
38	" 18-in. diam....	"			
39	" 20-in. diam.....				
40	" 24-in. diam.....	"			
41	" 30-in. diam	"			
42	" 36-in. diam	"			
43	" 42-in. diam	"			
44	" 48-in. diam...	"			
45	" 54-in. diam.....	"			
46	" 60-in. diam	"			
47	4-in agricultural under tile drains.....	"			
48	Cast iron pipe culverts, 16-in. diam	"			
49	" 18-in. diam	"			

Item.	Description of work.	Measure.	Quantity.	Rate.	Amount.
				$ cts.	$ cts.
50	Cast iron pipe culverts, 20-in. diam	l. ft.			
51	" 24-in. diam	"			
52	" 30-in. diam	"			
53	" 36-in. diam	"			
54	" 42-in. diam	"			
55	" 48-in. diam	"			
56	" 54-in. diam	"			
57	" 60-in. diam	"			
58	Concrete facing mixture (1–2) 2½-in. thick	c. yd.			
59	" 1–2 4 coping course 6-in. thick				
60	" 1–3–5				
61	" 1 3 6	"			
62	" 1–3–5 in arch culverts, including curbing				
63	" 1 3 6 " "	"			
64	" 1–3–6 in box culverts "	"			
65	" 1 4 8 ordinary foundations "				
66	" 1–4–8 walls of building "				
67	First-class masonry	"			
68	Second-class masonry				
69	Third-class masonry	"			
70	Dry masonry	"			
71	Masonry in arch ring, including centering	"			
72	Track-laying in main line with ordinary frogs, switches and sidings, including light surfacing 'A'	mile.			
73	Track-laying in yards at terminals	"			
74	Train hauled surfacing 'B'	c. yd.			
75	Ballasting	"			
76	Ties, first-class	each.			
77	" second-class	"			
78	" for switches, sawn to dimensions per M. ft. b.m				
79	Public road signs	each.			
80	Mile posts, whistle posts, and road signs	"			
81	Semaphores at stations, complete	"			
82	Interlocking appliances, complete, eight levers	"			
83	Each additional lever	"			
84	Fencing	rod.			
85	Gates	each.			
86	Tunnels, rock section (unlined)	l. ft.			
87	" lined	"			
88	" concrete lining	c. yd.			
89	" masonry lining	"			
90	Drainage tunnels, 4 c. yds. per ft	l. ft.			
91	Telegraph line	mile.			
92	Water tanks, 50,000 galls.	each.			
93	Turntables	"			
94	Track scales	"			
95	Tunnel shafts	c. yd.			
96	Iron in drift bolts	lbs.			
97	Iron in screw bolts	"			
98	Forged or cut spikes	"			
99	Cast-iron washers and separators	"			
100	Cattle-guards (3 sections)	each.			
101	Cast-iron pile shoes	"			

Approved. HUGH D. LUMSDEN,
Chief Engineer, Eastern Division, Transcontinental Railway.

Approved. H. A. WOODS,
Asst. Chief Engineer, Grand Trunk Pacific Railway.

Approved. FRANK W. MORSE,
Vice-president and Gen. Manager, Grand Trunk Pacific Railway.

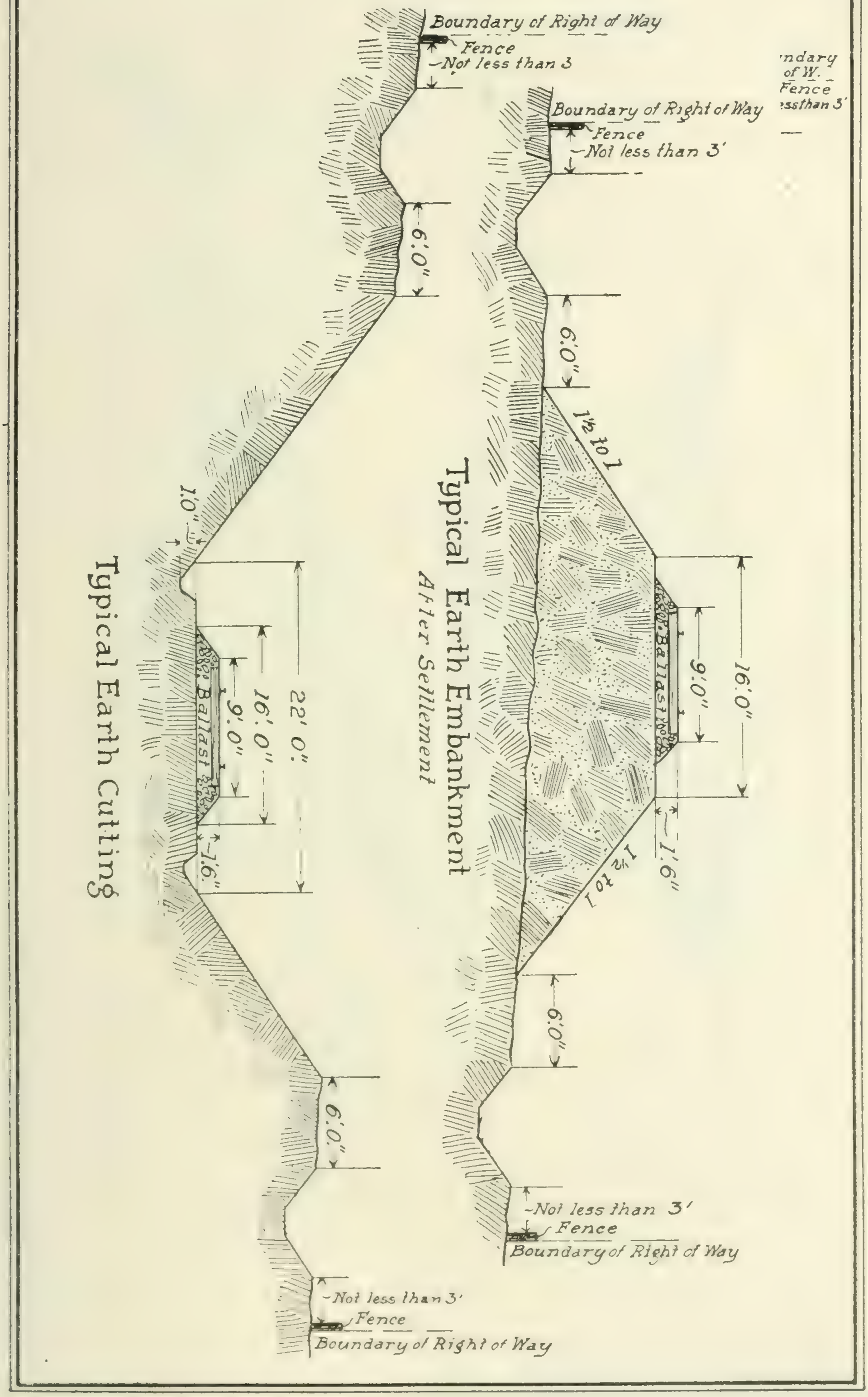
Approved by Commission, April 27, 1905.

F. B. WADE,
Chairman.

P. E. RYAN,
Secretary.

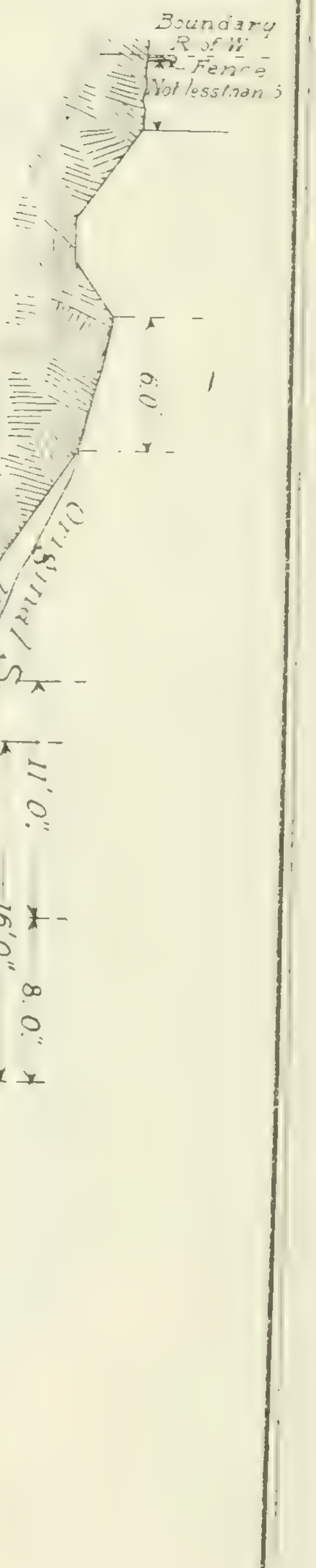
THE NATIONAL TRANSCONTINENTAL RAILWAY
EASTERN DIVISION

DR'NG. Nº 1



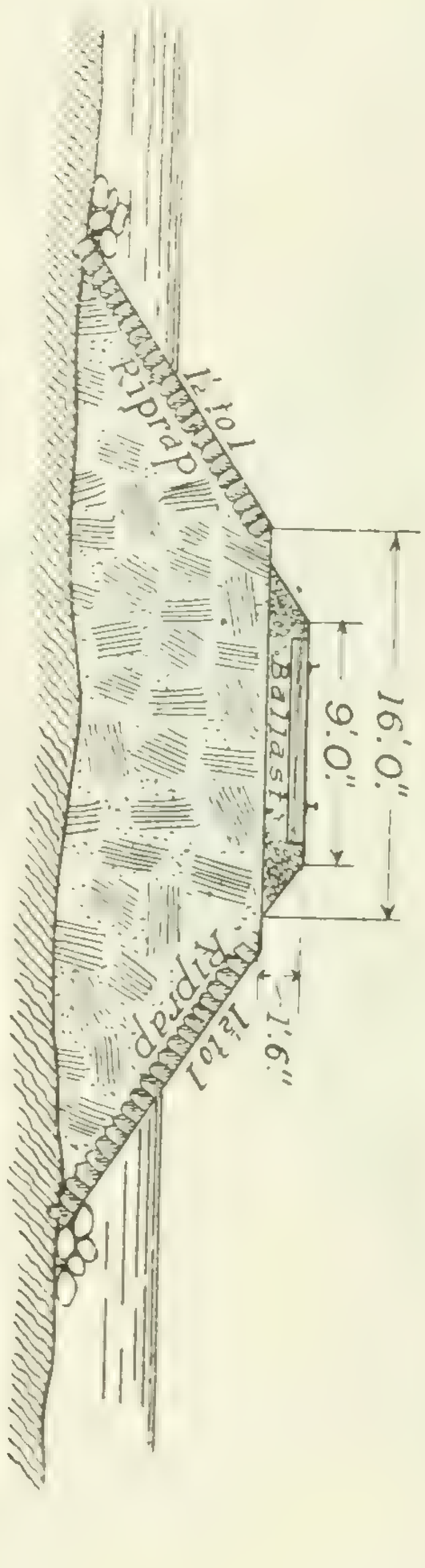
THE NATIONAL TRANSCONTINENTAL RAILWAY
EASTERN DIVISION

DR'NG. No 2



Typical Sidehill Cutting and Embankment.

Steep slopes to be well benched



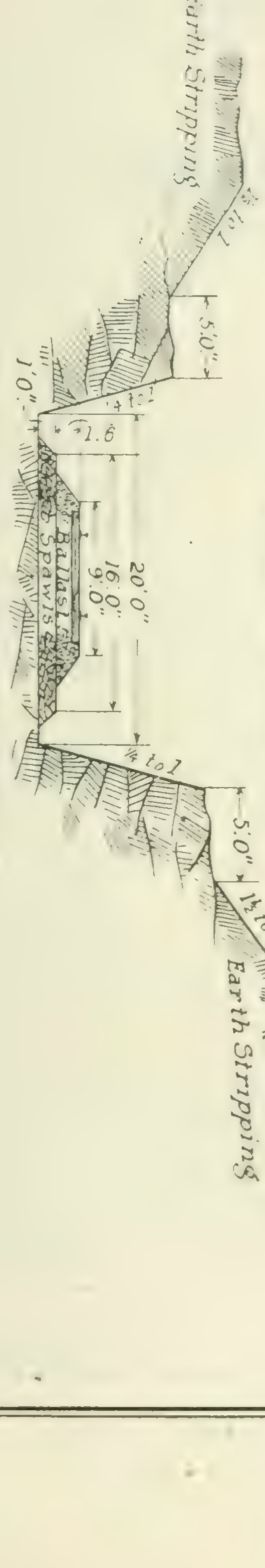
Typical Embankment in Water.

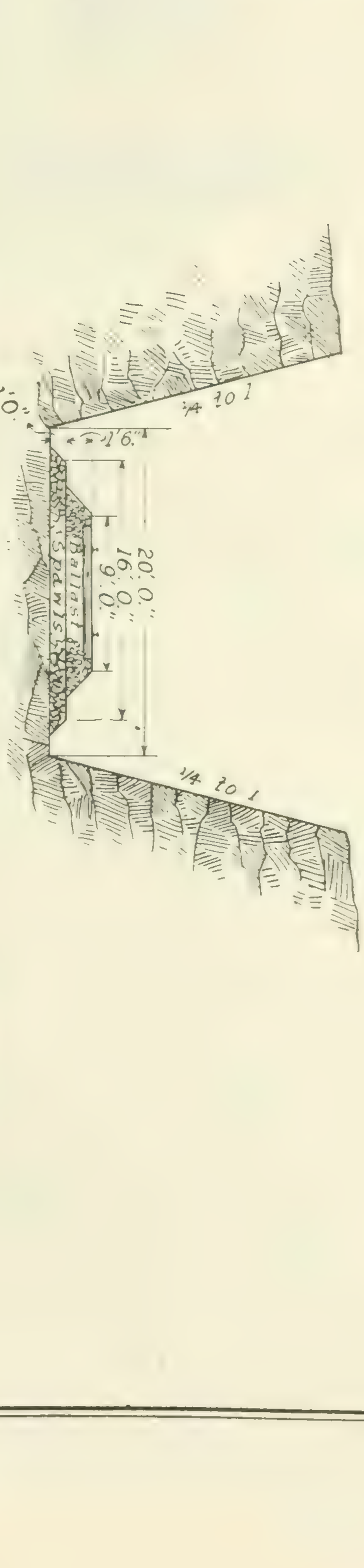
Showing Riprap Protection

THE NATIONAL TRANSCONTINENTAL RAILWAY
EASTERN DIVISION

DR'NG. No 3

Typical Rock and Earth Cutting



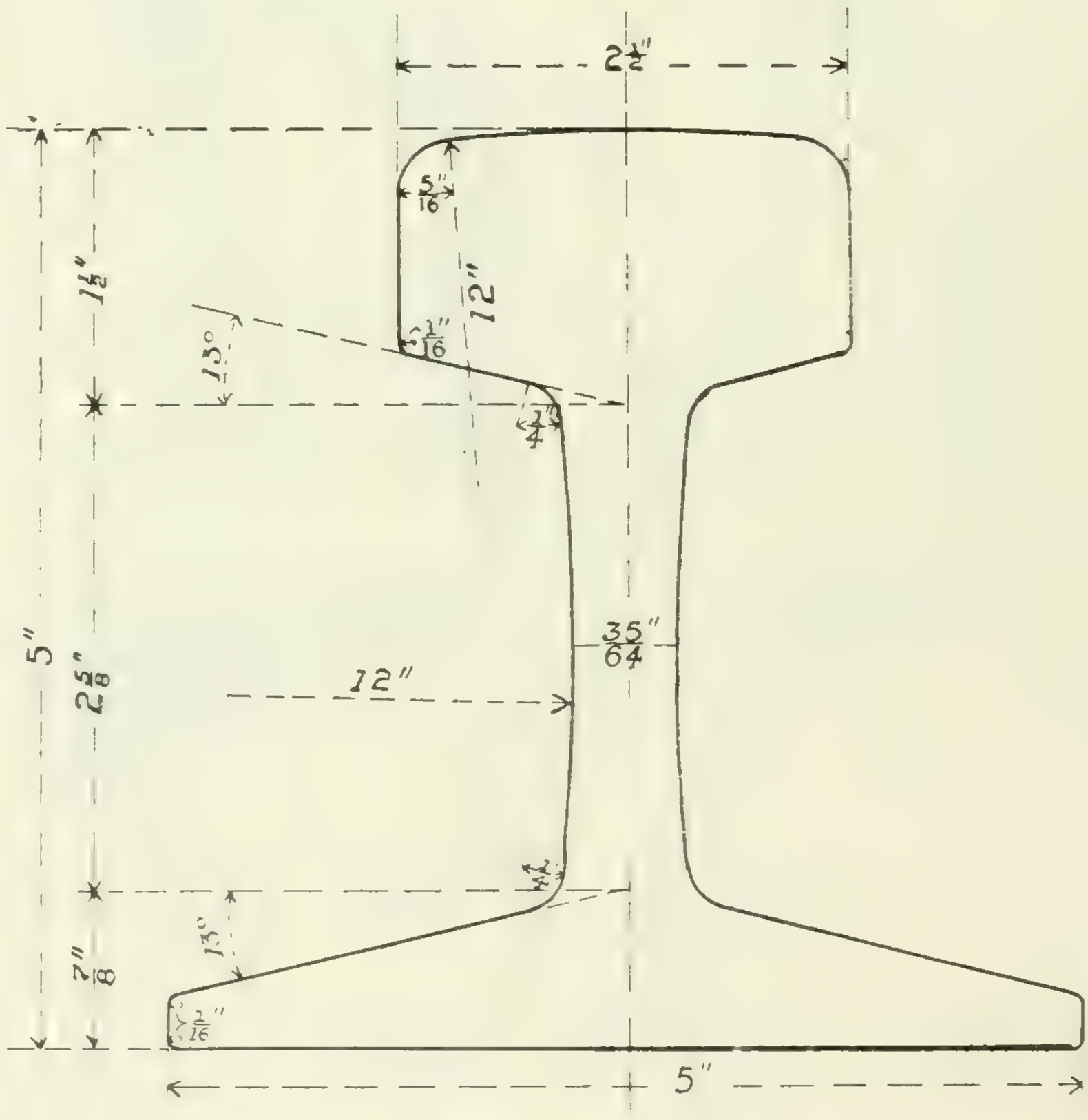


THE NATIONAL TRANS-CONTINENTAL RAILWAY.

EASTERN DIVISION

STANDARD RAIL SECTION

(Am.Soc.C.E.Pattern)



80 Lbs per Yard.

DR'NG No 4

Chief Engineer

INSTRUCTIONS TO PERSONS PROPOSING TO TENDER.

1. *Forms must be kept intact.*—No tender will be received if detached from the other forms with which it is bound; the entire package must be delivered unbroken and in good order, complete in all respects.

2. *Blank forms furnished must be used.*—Parties tendering are required in making their tenders to use the blanks prepared and furnished by the Commissioners, a copy of which, together with the forms of the contract, including the specifications and plans, may be obtained upon application therefor at the office of the Commissioners.

3. *Tenders to be made in triplicate.*—All tenders must be made in triplicate upon the printed forms, addressed to 'The Commissioners of the Transcontinental Railway,' Ottawa, Canada, and must be accompanied by a copy of the advertisement.

4. *Unbalanced tenders not acceptable.*—Any tender in which the prices stated for the several items are unbalanced may be rejected.

5. *Estimate of quantities.*—The tenders will be compared on the basis of the engineer's estimate of approximate quantities, of work to be done, of materials to be furnished, as shown in schedule hereunto attached.

6. *Estimate is approximate.*—The above-mentioned quantities are given for the purpose of comparison only, and all tenders are received on the following express conditions, which shall apply to and become a part of every tender received.

(*a*) Parties tendering must determine quantities for themselves, and must satisfy themselves by personal examination of the location of the proposed works, and by any other means which they may adopt, as to the accuracy of the quantities, classification, &c., of the engineer, and the nature and extent of the work to be performed, according to the specifications and plans.

(b) Contractor should make a personal examination.—Before submitting a proposal, the contractor should make a careful examination of the drawings and specifications received, the form of contract proposed to be used, and fully inform himself as to the quantity and quality of the materials and character of the workmanship required. He should visit the locality where the work is to be done and make a careful examination of the place where the materials are to be delivered, and of all other facts material for the purpose of determining the character and cost of the work.

7. *Additions, omissions and alterations at schedule price.*—Attention is called to the clauses of the contract giving power to the engineer to order extra work to be done and to make any additions to, omissions from, change or alteration in the alignment or grade of the railway or in the dimensions, nature, location or position of the works.

8. *Persons tendering must be qualified.*—Persons tendering must satisfy the Commissioners of their ability to furnish the materials and perform the work for which they tender.

9. *Certified cheque.*—Each tender must be signed and sealed by all the parties to the tender and witnessed, and be accompanied by an accepted cheque approved by the Commissioners for a sum equal to one-tenth of the amount of the tender, as liquidated damages, conditioned that the party making the tender shall, within ten days after the acceptance of said proposal, execute the contract for its faithful performance. In case the tender is accepted, the contractor shall, within ten days, complete and execute the contract by signing the agreement, specifications and other documents required by the Commissioners, and shall deposit with the Commissioners an accepted cheque approved by the Commissioners, for a sum equal to per cent of the amount of the tender, or by such other security as the Commissioners approve of as security for the due and faithful performance of the contract according to its terms.

10. *Rates of security to proposal.*—The security required for the faithful performance of the contract and specifications will not be more than ($\frac{1}{4}$) one-fourth of

security after proposals are opened
mated total consideration of the

11. Information to be furnished and conditions to be observed when
executed.

(a) The place of residence of each person executing, with num
must be given after his signature, which must be written in full

(b) All signatures must be witnessed and have affixed to them seals,
unless

(c) When a firm executes, the individual names and signatures of the
shall be written out and shall be signed in the firm name by a member
a power of attorney executed by the firm

(d) Whenever a bidder is a corporation, the legal name of the corporation,
the full name of each officer and Commissioner must be subscribed thereto
by the president or vice president and the commercial seal
of the corporation must be affixed and attested by the secretary
or assistant secretary. Bidders must also set forth the
full business address of the corporation and of each officer and Commissioner
signing the bid.

12. The time in which contracts shall be executed and delivered after
the award is made.

13. The right to reject any and all bids is reserved by the Commissioners.

By order of the Commissioners, this ..... day of .....
the month of ..... A. D. 19..

.....

the amount of the contract, but the right is reserved to increase the amount of said security after proposals are opened to a sum not exceeding (⅓) one-third of the estimated total consideration of the contract.

11. Information to be furnished and conditions to be imposed when contract is executed.

(a) The place of residence of each person tendering, with post office address, must be given after his signature, which must be written in full.

(b) All signatures must be witnessed and have affixed to them seals of wax or wafers.

(c) When a firm tenders, the individual names and addresses of the members shall be written out and shall be signed in full, giving Christian name, but the signers may, if they choose, describe themselves in addition, as doing business under a given name and style as a firm.

(d) Whenever a tender is made by a corporation, the tender must be signed with the full name of each officer of the corporation, and their addresses given in addition to the corporation signature, with official corporate seal thereto.

(e) Any one signing a proposal as an agent of another or others must file with it legal evidence of his authority to do so.

12. The right to reject any and all tenders is reserved by the Commissioners, if they deem it in the best interest of the work to do so.

13. The Commissioners will open all tenders received on the day of the month of , A.D., 190 , and not thereafter.

FORM OF TENDER.

RAILWAY CONSTRUCTION.

To the Commissioners of the Transcontinental Railway, Ottawa, Canada.

GENTLEMEN,—(I, or we), the undersigned, do hereby offer to the Commissioners to furnish all the materials, labour, implements, tools and machinery and to execute and complete all the works mentioned and described in the annexed specifications for the construction of in accordance with the plans and the said specifications, upon the terms and conditions set out in the printed form of contract, at and for the prices affixed to the different items in the following schedule, and to hold (myself or ourselves) in readiness, if (my or our) tender shall be accepted, to execute a contract for the due execution and completion of said works.

. . . . . .

No. of Items.	Description of Items.	Rate.
	(As per schedule).	

Accompanying this proposal is an accepted cheque on the Bank, for the sum of dollars, and we do hereby declare and agree that, in case of refusal or failure to execute the said contract and to furnish the security required by the Commissioners within ten days after the acceptance of this tender, the said cheque shall be forfeited to the said Commissioners as liquidated damages for such refusal or failure.

The full name and residence of all persons interested in the proposal as principals are as follows:—

(Notice.—Give Christian name, as well as surnames, and in case of a corporation sign name of president, treasurer and manager. The names of bidders may be made public, but the names of all parties interested with them, being required for the information and guidance of the Commissioners, may not be made public.)

This tender, pursuant to the provisions of the 19th section of chapter 71 of the statutes of Canada, 1903, is made subject to the express condition that no member of the Senate or of the House of Commons of Canada shall be a party to or concerned or interested in any contract with the Commissioners for the construction of any part of the Eastern Division of the National Transcontinental Railway or shall be a shareholder in any incorporated company having any such contract.

Dated at

. . . . . .

Actual Signature of Parties tendering.	Occupation.	Residence.
. . . . .	. . . . .	. . . . .

FORM OF CONTRACT.

(RAILWAY CONSTRUCTION.)

This Agreement made (in triplicate) the day of 190

Between:

(hereinafter called 'the Contractor')

of the first part,

and

The Commissioners of the Transcontinental Railway (hereinafter called 'the Commissioners')

of the second part

WITNESSETH as follows:—

General Covenant.

In consideration of the covenants and agreements hereinafter contained and to be performed by the Commissioners and of the price hereinafter mentioned, the Contractor hereby covenants and agrees with the Commissioners as follows:—

Meaning of word 'Work.'

1. In this agreement the word 'work' or 'works' shall, unless the context requires a different meaning, mean the whole of the work and materials, matters and things required to be done, furnished and performed by the contractor under this contract.

'Engineer,' 'Chief Engineer' defined.

2. The words 'Engineer' or 'Chief Engineer' when used in this agreement or in the specification hereunto annexed, shall mean the chief engineer of the Commissioners, for the time being, acting as such either directly or through the assistant chief engineer, district engineer, division engineer, resident engineer or inspector, having immediate charge of a portion thereof limited by the particular duties entrusted to him. All instructions and directions or certificates given, or decisions made by any one acting under the authority of the chief engineer shall be subject to his approval and may be cancelled, altered, modified and changed as he may see fit. In all cases where the contractor is dissatified with the decision of the engineer or inspector in immediate charge of the work, an appeal to the chief engineer may be made.

Construction of Clauses as Covenants.

3. Whenever in this agreement it is stipulated that anything shall be done or performed by either of the parties hereto, it shall have the same effect and be construed as if the said party had entered into a covenant with the other party to do or perform the same, and that any such covenant on the part of the contractor had been expressly made not only on his own behalf, but also on behalf of his executors, administrators and assigns, and that any such covenant on the part of the Commissioners had been expressly made on behalf of themselves and their successors. Whenever this agreement is entered into by more than one party as parties of the first part, the word 'contractor' shall be read 'contractors,' and all pronouns in this contract or in the specifications hereunto annexed, referring to the contractor, shall be read as plural, and whenever a corporation is the party of the first part, the said pronouns shall be read accordingly.

Performance by Contractor.

4. The contractor will, at his own expense, furnish all and every kind of labour, machinery and other plant, services and materials whatsoever necessary for the due execution and completion of all and every the works set out or referred to in the specifications hereunto annexed, or referred to in the plans and drawings prepared and to be prepared for the purposes of the work, and will construct, complete and finish in the most thorough, workmanlike and substantial manner in every respect, to the satisfaction and approval of the chief engineer, in the manner herein specified, and limited and according to the plans and specifications hereto annexed, and which for purposes of identification have been signed by the contractor and the secretary of the commission and form part of this contract, and will, on or before the day of next finally complete and deliver to the Commissioners the following work, that is to say, all the clearing, grubbing, grading, embankment protection, truss, pile and trestle bridging, masonry and concrete culverts, pipe culverts, piers, abutments, road crossings, cattle-guards tracklaying, surfacing, ballasting, all the work necessary in connection with the construction of the depots, section houses, water service, stream diversions, shops, roundhouses, turntables, fences, gates and other structures, and all the work for which prices are hereinafter specified, including such other and extra work as may be required to finally complete and finish, ready for operation, a single track railway, with side tracks, yards, including terminal yards, depot grounds, spurs, and other necessary and appurtenant tracks extending from

Time of the Essence of the Contract.

5. Time shall be of the essence of this contract.

Manner of Performance.

6. All of the said works shall be constructed of the best materials of their several kinds, and finished in the best and most workmanlike manner, in the manner required by and in strict conformity with the said specifications and the drawings relating thereto, and the working or detail drawings which may, from time to time, be furnished (which said specifications and drawings and the working of detail drawings to be hereafter furnished are hereby declared to be part of this contract), and to the complete satisfaction of the chief engineer.

Several Clauses of the Contract to be read together.

7. The several parts of this contract shall be taken together, to explain each other, and to make the whole consistent; and if it be found that anything has been omitted or mis-stated, which is necessary for the proper performance and completion of any part of the work herein mentioned and described, the contractor will, at his own expense, execute the same as though it had been inserted and properly described, and the correction of any such error or omission shall not be deemed to be an addition or deviation from the works hereby contracted for.

Commencement and Prosecution of Work.

8. The said work shall be commenced immediately after the execution of this agreement, and shall be proceeded with continuously and diligently, and under the personal supervision of the contractor, until completed. The work shall be carried on and prosecuted in all its several parts in such a manner and at such points and places as the engineer shall, from time to time, direct and to his satisfaction, but always according to the provisions of this agreement, and, if no direction is given, then in a careful, prompt and workmanlike manner, according to this agreement. The contractor shall make and keep open for use in safe condition, all crossings and approaches wherever the line of railway traverses any public or private road, and shall alter and amend such

roads, crossings and approaches whenever required by the engineer in charge of the work, during the construction of the line.

Agreement not to be Assigned.

9. This agreement shall not be assigned, nor shall the said work or any part thereof be sub-contracted without the written consent of the chief engineer to every such assignment or sub-contract.

Control of the Work by Engineer.

10. The contractor shall in all things conform to and comply with the instructions of the engineer. All work and material shall be subject to the approval of the engineer, and any work or material which, in the opinion of the engineer, is not of the character, quality, dimensions or design required by the plans or specifications or which is in the judgment of the engineer otherwise in any manner defective, imperfect or insufficient, shall be replaced or remedied when pointed out to the contractor by the engineer, and shall be made good and sufficient by the contractor, at his own expense, and to the satisfaction of the engineer, who shall have the power and whose duty it shall be, to have any defective work or material taken out and rebuilt, or replaced at the expense of the contractor. Any omission by the engineer to disapprove of or reject any insufficient or imperfect work at the time of any estimate shall not be deemed an acceptance of such work or material.

Changes and Extra Work.

11. The engineer shall be at liberty at any time, either before the commencement or during the construction of the works or any portion thereof, to order any extra work to be done and to make any change or alteration which he may deem expedient in the alignment or grade of the railway, or in the dimensions, nature, location or position of the works or of any part or parts thereof, or in any other thing connected with the works, whether or not such changes increase or diminish the work to be done, or the cost of doing the same, and the contractor shall immediately comply with all written requisitions of the engineer in that behalf, but the contractor shall not make any change in or addition to, or omission, or deviation from the works, and shall not be entitled to any payment for any change, addition, deviation or any extra work unless such change, addition, omission, deviation, or extra work shall have been first directed in writing by the engineer and notified to the contractor in writing, nor unless the price to be paid for any addition or extra work shall have been previously fixed by the engineer in writing, and the decision of the engineer as to whether any such change or deviation increases or diminishes the cost of the work, and as to the amount to be paid or deducted as the case may be in respect thereof shall be final, and the obtaining of his decision in writing as to such amount shall be a condition precedent to the right of the contractor to be paid therefor. If any such change or alteration, in the opinion of the said engineer, shall materially affect the cost of doing the work, he shall fix or determine the price to be paid either above or below the prices hereinbefore provided to be paid for such work, as the case may be, so as to do substantial justice to both parties, and his decision as to the amount to be fixed for the price of such work shall be final.

Clauses of Contract to Apply to Changes and Extra Work.

12. All the clauses of this contract shall apply to any changes, additions, omissions, deviation, or extra work, in like manner and to the same extent as to the works contracted for, and no changes, additions, deviations, omissions or extra work shall annul or invalidate this contract.

No Claim for Loss of Profits.

13. If any change or deviation in, or omission from the works be made by which the amount of work to be done shall be decreased, no compensation shall be claimable by the contractor for any loss of anticipated profits in respect thereof.

Claims for Extra Work to be Presented at End of Month.

14. All claims for extra work or material must be presented to the engineer for allowance at the end of the month in which the same shall have been done or furnished, and shall, if allowed by the engineer, be in cluded in the estimate for that month, otherwise all claims therefor shall be deemed to be absolutely waived by the contractor and the Commissioners shall not be required to allow or pay for same, unless, in the judgment of the Commissioners under the circumstances of the case, it is reasonable and proper to do so.

Engineer Sole Judge.

15. The engineer shall be the sole judge of work and material in respect of both quantity and quality, and his decision on all questions in dispute with regard to work or material shall be final, and no works or extra or additional works or changes shall be deemed to have been executed, nor shall the contractor be entitled to payment for the same unless the same shall have been executed to the satisfaction of the engineer, as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the contractor to be paid therefor.

Prices in Schedule to Include all Things Necessary for Execution and Completion of Work.

16. The prices to be paid for the different kinds of work set out or referred to in the list or schedule of prices are intended to and shall include not merely the particular kind of work or materials mentioned in the said list or schedule, but also all and every kind of work, labour, tools and plant, materials, articles and things whatsoever necessary for the full execution and completion ready for use of the respective portions of the works, to the satisfaction of the engineer. And in case of dispute as to what labour, material, tools and plant are or are not so included the decision of the engineer shall be final and conclusive.

Foreman.

17. A competent foreman shall be kept on the ground by the contractor during all the working hours to receive the orders of the engineer, and should the person so appointed be deemed by the engineer incompetent or conduct himself improperly he may be discharged by the engineer and another shall be at once appointed in his stead; such foreman shall be considered as the lawful representative of the contractor and shall have full power to carry out all requisitions and instructions of the engineer.

Material Objected to must be Removed.

18. In case any materials, or other things in the opinion of the engineer, which are not in accordance with the several parts of this contract or are not sufficiently sound or are otherwise unsuitable for the respective works, shall be used for or brought to the intended works, or any part thereof, or in case any work shall be improperly executed, the engineer may require the contractor to remove the same, and to provide proper materials or other things, or to properly re-execute the work, as the case may be; and thereupon the contractor shall and will immediately comply with the said requisition, and if twenty-four hours shall elapse and such requisition shall not have been complied with the engineer may cause such materials or other things, or such work, to be re-

moved, and, in any such case, the contractor shall pay to the Commissioners all such damages and expenses as shall be incurred in the removal of such materials, or other things, or of such work, or the Commissioners may, in their discretion, retain and deduct such damages and expenses from any amounts payable to the contractor.

Machinery and Plant to be Property of Commissioners during Construction.

19. All machinery and other plant, materials and things whatsoever provided by the contractor for the works hereby contracted for, and not rejected under the provision of the last preceding clause, shall, from the time of their being so provided, become, and, until the final completion of the said work, shall be the property of the Commissioners for the purpose of the said works, and the same shall on no account be taken away, or used or disposed of except for the purposes of the said works without the consent in writing of the engineer, and the Commissioners shall not be answerable for any loss or damage whatsoever which may happen to such machinery or other plant, material or things, provided always that, upon the completion of the works and upon payment by the contractor of all such moneys, if any, as shall be due from him to the Commissioners, such of the said machinery and other plant, materials and things as shall not have been used and converted in the works and shall remain undisposed of, shall, upon demand, be delivered up to the contractor.

Power to take Work out of Contractor's Hands.

20. In case the contractor shall make default or delay in diligently continuing to execute or advance the works to the satisfaction of the engineer, and such default or delay shall continue for six days after notice in writing shall have been given by the engineer to the contractor requiring him to put an end to such default or delay, or in case the contractor shall become insolvent, or make an assignment for the benefit of creditors, or neglect either personally or by a skilful and competent agent to superintend the works, then in any of such cases the Commissioners may take the work out of the hands of the contractor and employ such means as they may see fit to complete the work, and the contractor shall have no claim for any further payment in respect of the works performed, but shall nevertheless remain liable for all loss or damage which may be suffered by reason of the non-completion by him of the works; and all materials and things whatsoever, and all horses, machinery and other plant provided by him for the purposes of the works, shall remain and be considered as the property of the Commissioners for the purposes and according to the provisions and conditions contained in paragraph 22 hereof.

Abandonment of Work by Contractor.

21. If the work to be done under this agreement shall be abandoned, or be assigned by the contractor without the consent of the Commissioners, or if the contractor shall lose control of the work for any cause, excepting the acts of God or of the public enemy, or if at any time the chief engineer shall be of the opinion, and shall so certify in writing to the Commissioners that the contractor is wilfully and persistently violating any of the conditions or covenants of this contract, or is not executing said contract in good faith, the Commissioners may take the work out of the hands of the contractor and may employ such means as they may see fit to complete the work, and all the provisions of section 20 of this agreement shall thereupon apply and the Commissioners shall have in regard to the said work all the powers therein provided.

Power to Employ additional Men, Horses, Plant, &c.

22. If the engineer shall at any time consider that the number of workmen, horses, or quantity of machinery or other plant, or the quantity of proper materials, respectively employed, provided or supplied by the contractor on or for the said works, is insufficient for the advancement thereof towards completion within the limited time,

or that the works are, or some part thereof is, not being carried on with due diligence, then in every such case the engineer may, by written notice to the contractor, require him to employ or provide such additional workmen, horses, machinery or other plant or materials as the engineer may think necessary, and, in case the contractor shall not thereupon within three days, or such other longer period as may be fixed by any such notice, in all respects comply therewith, then the engineer may, either on behalf of the Commissioners, or, if he sees fit, may as the agent of and on account of the contractor, but in either case at the expense of the contractor, provide and employ such additional workmen, horses, machinery and other plant, or any portion thereof, or such additional materials respectively as he may think proper, and may pay such additional workmen such wages, and for such additional horses, machinery or other plant and materials respectively such prices as he may think proper, and all such wages and prices respectively shall thereupon at once be repaid by the contractor, or the same may be retained and deducted out of any sum that may then or thereafter be or become due from the Commissioners to the contractor, and the Commissioners may use in the execution or advancement of the said works not only the horses, machinery, and other plant and materials so in any case provided by any one on their behalf, but also all such as may have been or may be provided by or on behalf of the said contractor.

Works at the Risk of Contractor until Completion.

23. The contractor shall be at the risk of and shall bear all loss of damage whatsoever, from whatsoever cause arising, which may occur to the works or any of them until the same shall be fully and finally completed and delivered up to and accepted by the Commissioners, and if any such loss or damage shall occur before such final completion, delivery and acceptance, the contractor shall immediately, at his own expense, repair, restore and re-execute the work so damaged.

Damage Generally.

24. The contractor and his agents, labourers, and all employed by him or under his control, shall use due care that no person or property is injured or any rights infringed in the prosecution of the said work, and the contractor shall be responsible for all damage claimable by any person or corporation whatsoever in respect of any injury to persons or property in respect of any infringement of any right whatsoever, including damage by fire occasioned in his carrying on of said works, or by any neglect or misfeasance or nonfeasance on his part or on the part of his servants or employees, and shall and will, at his own expense, maks such temporary provision as may be necessary for the protection of persons, or of lands, buildings, animals or other property or to prevent the interruption of the traffic on any public or private road, or for the uninterrupted enjoyment of all rights of persons or corporations in and during the performance of the said works.

Stoppage of Work and Reduction of Force.

25. The Commissioners shall have the right to suspend operations from time to time at any particular point or points or upon the whole of the works, or to direct that the force employed on the works shall be diminished, and the contractor, upon being requested in writing so to do by the Commissioners, shall stop the work or reduce the force as the case may be in accordance with such written request, and the contractor shall have no claim for damage by reason thereof. Such writing shall be signed by the engineer and delivered to the contractor, or to some person on the work representing the contractor, at least ten days previous to such stoppage of work or reduction of force.

Extension of Time in Case of Stoppage of Work.

26. If there be any stoppage of the said work upon the written directions of the Commissioners or if its progress be materially delayed from want of location or stak-

ing of the line or work or securing of the right of way by reason of any act or neglect of any of the engineers or agents or employees of the Commissioners, the time herein specified for completing the said work shall be extended for a period of time equal to the time of such stoppage or delay, and the contractor shall have no further or other claim therefor, or from anything arising therefrom or caused thereby. The right of the contractor to such extension shall be deemed to have been waived unless a claim therefor, stating the occasion and nature thereof, shall be made by him in writing, delivered to the Commissioners at the time of such stoppage or delay. At any time after operations have been suspended, either in whole or in part, such operations may be again resumed and again suspended and resumed as the Commissioners may deem proper, and the contractor, upon receiving written notice on behalf of the Commissioners that the suspended operations are to be resumed, shall at once resume the prosecution of the work under this contract and diligently carry on the same.

Total Suspension with the Consent of the Commissioners.

27. In case of a total suspension of all work under this agreement without any fault, default, collusion or procurement of the contractor for a longer period than days unless such suspension shall have been caused by the winter season or protracted rigor of weather, it shall be the duty of the engineer to make a final estimate of the work done according to the terms of this agreement, and to make a return thereof to the Commissioners when the amount found by the engineer to be then due for work done, together with all percentages retained up to that time, except as herein otherwise provided, shall be paid to the contractor.

28. No delay within or beyond the period herein specified for completing the said work shall vitiate or void this contract, or any part thereof, or the obligation hereby imposed upon the contractor, or shall make void or in anywise impair or affect any current or other bond or security for the performance of this contract, and all the covenants and agreements in this contract and in the said specifications contained shall apply to this contract until the said work is finally completed and accepted, notwithstanding the fact that such work is not completed within the time specified herein for such completion.

Contractor to Pay for Labour Promptly.

29. The contractor shall promptly pay for all labour, services and material in or about the construction of the work and all payments for such purpose shall be made by the contractor at least as often as payments are made by the Commissioners to the contractor, and in the event of failure of the contractor at any time to do so, the Commissioners may retain from all moneys due or to become due to the contractor such amount of money as the chief engineer may deem sufficient to make such payments. If the engineer reports that there is reason to fear that any such payment will not be promptly made by the contractor, the Commissioners may pay for any such labour, services and material from any date to any date and to any amount which may be payable and may charge the same to the contractor, and the contractor covenants with the Commissioners to repay at once all and every sum so paid. Before final settlement is made between the parties hereto for work done and materials furnished under the contract, the contractor shall and will produce and furnish evidence satisfactory to the Commissioners that the said work and any other property of the Commissioners upon which said work may have been constructed and all structures are free and clear from all liens for labour, workmanship, materials or otherwise and that no claim then exists in respect of which a lien upon the said work or property of the Commissioners could or might attach. And the contractor shall protect and hold harmless the Commissioners and all their property from any and all kinds of liens accruing from labour and services performed and material furnished or otherwise and any of the same in or about the said work.

Damage by Fire.

30. Any damage by fire that may occur to buildings or structures during construction, must be made good by the contractor, who must keep such structures fully insured until the same have been completed and accepted by the Commissioners. The operation or occupation by the Commissioners of a portion of the work, before the completion of the whole, is not to be considered as an acceptance of the same by the Commissioners. The premiums for fire insurance shall be payable by the contractor, and the policies are to be made payable to the Commissioners or in such form as they may direct, the loss being made payable as the interest of the contractor and of the Commissioners respectively may appear and the policy or policies shall be deposited with the chief engineer of the Commissioners until the completion and acceptance of the work.

Intoxicating Liquors.

31. The contractor shall not bring or permit to be brought anywhere on or near the said work any spirituous or intoxicating liquors, and if any foreman, labourer or other employee or contractor, in the opinion of the engineer, be intemperate, disorderly, incompetent, wilfully negligent or dishonest in the prformance of his duties, he shall, on the direction of the engineer, be forthwith discharged and the contractor shall not employ or permit to remain upon the work any person who shall have been discharged from the said work for any or all of the said causes.

32. Upon the completion of the work, the contractor shall remove all temporary structures, fill up all holes and trenches, level all mounds or heaps of earth that may have been dug or built by him in the execution of the work or incident thereto and shall remove and clean away all surplus and waste materials or rubbish of whatever kind remaining on or about the works, and deposit such refuse material at such place as the engineer may designate.

Commissioners Covenant to Pay.

33. In consideration of the faithful performance by the contractor of all and singular the covenants and agreements herein contained, the Commissioners hereby covenant and agree with the contractor that they will well and truly pay to him on the full completion by him of all the work herein specified and limited for the completion thereof to the satisfaction and subject to acceptance by their chief engineer and subject also as herein provided, the following sums and prices, namely:—

34. Cash payments equal to about ninety per cent of the value of the work done, approximately made up from the returns of progress measurement and computed at the prices agreed upon or determined under the provisions of this agreement, will be made to the contractor monthly, on the written certificate of the engineer that the work for, or on account of which, the certificate is granted has been duly executed to his satisfaction and stating the value of such work computed as mentioned, and upon approval of such certificate by the Commissioners; and the said certificate and such approval thereof shall be a condition precedent to the right of the contractor to be paid the said ninety per cent, or any part thereof. The remaining ten per cent shall be retained until the final completion of the whole work to the satisfaction of the chief engineer for the time being having control over the work; and within two months after such completion the remaining ten per cent will be paid; and the written certificate of the said engineer, certifying to the final completion of the said works to his satisfaction, shall be a condition precedent to the right of the contractor to receive or to be paid the said remaining ten per cent, or any part thereof.

Price for Extra Work.

35. In addition to the foregoing contract price, the Commissioners will pay to the contractor for extra work or for work done under written orders of the engineer, not

covered by this agreement, but done in the proper execution of this contract, and for which prices are not named herein, the actual cost of such work, with an additional ten per cent on the cost of labour and material for the use of tools, contractor's plant, superintendence and profit, but such actual cost shall not exceed the reasonable market value of such labour and material as the case may be.

36. Where, in the opinion of the chief engineer, the work done is not, having regard to the character and nature of the work remaining to be performed, of sufficient value to justify computation of the prices agreed upon and determined under the provisions of this agreement, it shall be competent for the chief engineer, in certifying the value of the work done for the purpose of such payment, to disregard the prices so agreed upon or determined, and to compute and certify its relative and proportionate value having regard to the nature and character of the work remaining to be performed; in which case the contractor shall only be entitled to receive ninety per cent of the value of the work done as stated in such certificate, and he shall not be paid the difference between ninety per cnt of the value of the work done as so ascertained and certified, and ninety per cent of the value of such work according to the prices stipulated therefor under the provisions of this agreement, until such time as the chief engineer, by reason of the performance of additional work of greater relative value, shall certify that the contractor is entitled to receive the same.

37. It is intended that every allowance to which the contractor is fairly entitled will be embraced in the engineer's monthly certificates; but, should the contractor at any time have claims of any description which he considers are not included in the progress certificates, it will be necessary for him to make and repeat such claims in writing to the engineer within thirty days after the date of the despatch to the contractor of each and every certificate in which he alleges such claims to have been omitted.

38. The contractor in presenting claims of the kind referred to in the last preceding paragraph must accompany them with satisfactory evidence of their accuracy, and the reason why he thinks they should be allowed. Unless such claims are thus made during the progress of the work, within thirty days, as in the preceding clause, and repeated in writing, every month, until finally adjusted or rejected, the contractor shall have no claim upon the Commissioners in respect thereof.

39. The progress measurements and progress certificates shall not in any respect be taken as binding upon the Commissioners, or as final measurements or as fixing final amounts; they are to be subject to the revision of the engineer in making up his final certificate, and they shall not in any respect be taken as an acceptance of the work or release of the contractor from responsibility in respect thereof, but he shall at the conclusion of the works deliver over the same in good order, according to the true intent and meaning of this agreement.

Contractor's Information.

40. This agreement is made and entered into by the contractor for the consideration herein expressed, solely on his own knowledge, information and judgment of the character and topography of the country, its streams, watercourses and rainfalls and subject to the same, and upon information derived from other sources than the Commissioners, its officers or agents, of and respecting the nature and formation of the property upon which the said work is to be done, or the character, quantities or location of the material required to be removed or to be used in forming the road-bed for the said railway, and that the contractor does not rely upon any information given or statement or representation made to him in connection with the said contract by the Commissioners or any of its officers or agents. The contractor further declares and agrees that the plans, maps and profiles of the said work, furnished by the Commissioners and the quantities estimated therefrom are given only for the purpose of comparison of tenders.

41. The contractor shall not have nor make any claim or demand, or file a petition of right against the Commissioners for any damage which he may sustain by reason of any delay in the progress of the work, arising from the acts of any of the Commissioners' agents, and it is agreed that, in the event of any such delay, the contractor shall have such further time for the completion of the works as may be fixed in that behalf by the Commissioners.

42. No action shall be brought against the Commissioners upon this agreement or for any breach of any covenants herein contained, nor for any work done or claimed to be done or for damages arising out of or by reason of this agreement, but the remedy of the contractor shall only be by way of petition of right against His Majesty the King, represented by the government of the Dominion of Canada; and it is hereby agreed that all matters of difference arising between the parties hereto upon any matter connected with or arising out of this agreement, the decision whereof is not hereby especially given to the engineer, shall be referred to the Exchequer Court of Canada.

43. This contract is hereby, pursuant to the provisions of the 19th section of chapter 71 of the statutes of Canada, 1903, made subject to the express condition that no member of the Senate or of the House of Commons of Canada shall be a party to or concerned or interested in any contract with the Commissioners for the construction of any part of the eastern division of the National Transcontinental Railway, or shall be a shareholder in any incorporated company having any such contract.

44. The contractors will protect and will not remove or destroy, or permit to be removed or destroyed, the stakes, buoys and other marks placed on or about the said works by the engineers of the works, and shall furnish the necessary assistance to correct or replace any stake or mark which through any cause may have been removed or destroyed.

45. Any notice or other communication mentioned in this contract to be notified or given to the contractor shall be deemed to be well and sufficiently notified or given if the same be left at the contractor's office or mailed in any post office to the contractor or foreman, addressed to the address mentioned in this contract, or to the contractor's last known place of business.

46. All mechanics, labourers, or other persons who perform labour for the purpose of the construction of the works hereby contracted for shall be paid such wages as are generally accepted as current for competent workmen in the district in which the work is being performed, and, if there is no current rate in such district, then a fair and reasonable rate, and in the event of a dispute arising as to what is the current or a fair and reasonable rate it shall be determined by the Commisisoners, whose decision shall be final.

47. This agreement is subject to the regulations now in force or which may at any time hereafter be in force during the construction of the works hereby contracted for, made under the authority of the Department of Labour and which are or shall be applicable to such works.

48. All the works carried on under this agreement shall be subject to the provisions of the Act respecting the Preservation of Health on Public Works and to all regulations made or to be hereafter made pursuant to the said Act, or by any other lawful authority, and applicable to such works, and to any regulations which may be adopted by the Commissioners in reference to sanitation or the preservation of health on public works.

49. The contractor shall at his own expense make adequate arrangements for the medical and sanitary supervision of all his employes, and shall for that purpose employ the necessary duly qualified medical practitioners, furnish and provide all necessary medicines, surgical instruments and hospital accommodation to the satisfaction of the chief engineer.

The duties of the medical staff shall include not only the attendance on sick or injured men, but the inspection of the sanitary arrangements of all camps, dwellings and works at least once a month, or oftener if, in the opinion of the engineer, it is necessary.

In order to compensate the contractor for such supervision he shall deduct from the wages of every man in his employment in the district or districts in which this contract is situated the sum of cents per month, or a proportional rate for a less period.

It shall be optional on the part of the Commissioners should they see fit so to do to take over the medical and sanitary supervision of all men, camps, dwellings and works, and should they elect to do so the contractor shall deduct from the wages of all employees as before stated the sum of cents per month, or a proportional rate for a less period, and shall furnish to the Commissioners at the end of each month a full and correct statement of all such deductions, and the Commissioners shall subtract the total amount of such deductions from the moneys due or to become due to the contractor on account of estimates for that month.

50. The contractor shall observe and comply with all regulations made by any lawful authority and with all regulations of the Commissioners and instructions from the engineer of the said works, from time to time during the construction, made or given with reference to the prevention and extinguishing of fires, and shall pay all wages and other outlay occasioned by such regulations and instructions.

51. It is distinctly declared that no implied contract of any kind whatsoever, by or on behalf of the Commissioners, shall arise or be implied from anything in this contract contained, or from any position or situation of the parties at any time, it being clearly understood and agreed that the express contracts, covenants and agreements herein contained and made by the Commissioners are and shall be the only contracts, covenants and agreements upon which any rights against it are to be founded.

IN WITNESS WHEREOF the parties hereto have herewith caused these presents to be signed and sealed on the day and year first above written.

Signed, sealed and delivered by the contractor
in the presence of:

Signature of Contractor.

Signed sealed and delivered by the Commissioners in the presence of: